



Radio Control CAR ACTION

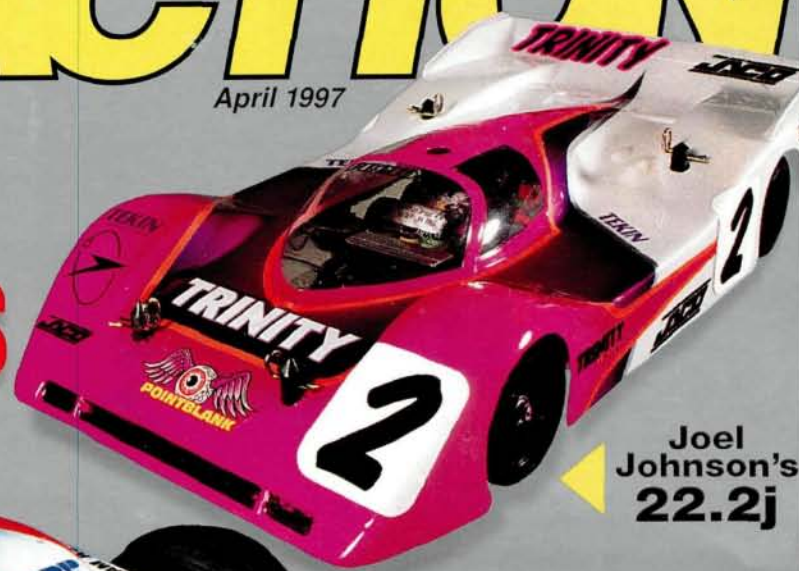
THE WORLD'S LEADING R/C CAR MAGAZINE

April 1997

Set up like the champs



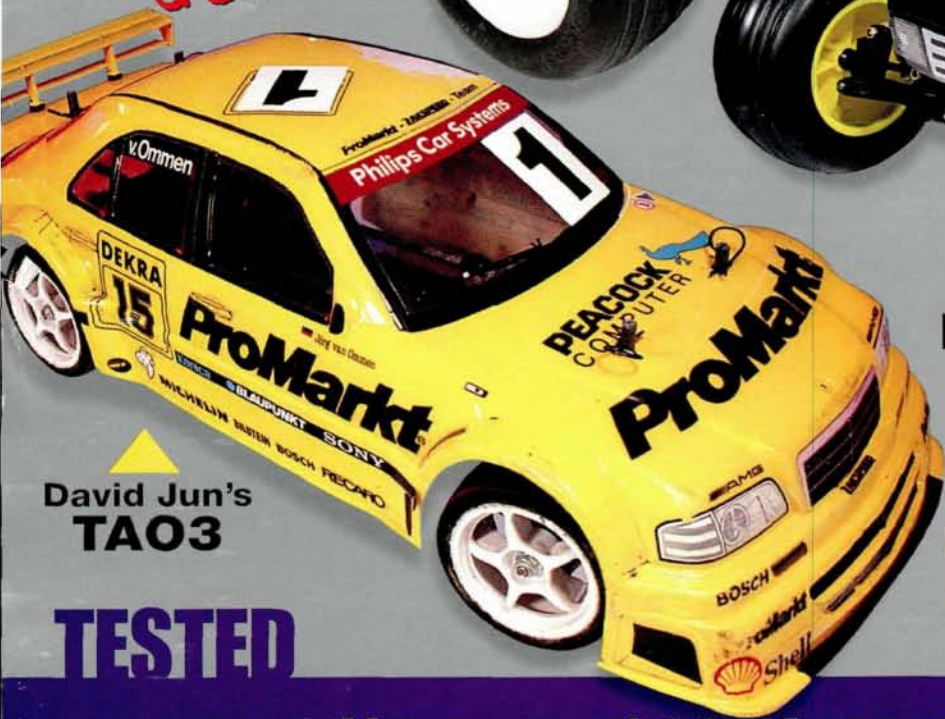
Mark Pavidis'
RC10T2



Joel Johnson's
22.2j



Richard Saxton's
RC10GT



David Jun's
TA03

Get dialed in! pg. 89

DISCHARGER GUIDE
14 products that make your cells live longer

TESTED

ROADRUNNER Xpress and 962K BOLINK All-Star Legend PRO-LINE M3 Tires ELITE Car Stand SLIXXS Graphics Decals ROBINSON RACING Absolute Spur Gears

www.airage.com/rcca



USA \$4.95
CANADA \$5.95

Radio Control CAR ACTION

VOLUME 12, NUMBER 4 • APRIL 1997

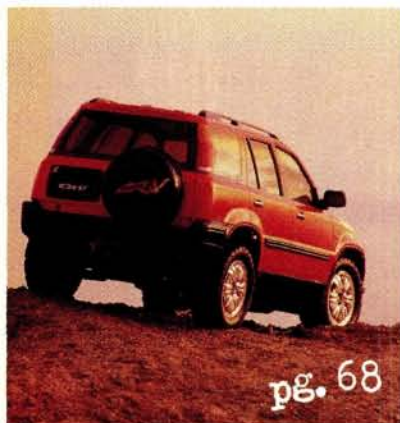


features

54 New Product Watch

- Robinson Racing's 'Absolute' Gears
- Slix Decals
- Elite Car Stand
- Pro-Line M3 Tires

pg. 106



pg. 68

89 Championship-winning setups

Dirt, carpet & asphalt:
How the pros get dialed in
by John Howell

96 How to: Wire Neatly

Professional routing tricks
by Peter Vieira

100 Body Wash Shootout

The Battle of the Bubbles
by George M. Gonzalez

106 Tamiya World Championship

U.S. champs take on the world • by Eric Sands

117 Your Guide to Battery Dischargers

14 ways to make your cells live longer
by George M. Gonzalez

134 Second Look: Kyosho TF-2

Tuning and modifying Kyosho's "Touring Force"
by Doug Mertes

151 How to: Test Dry-Cells

All "double-As" are not equal • by Rick Eyrich

DEPARTMENTS

- 16 Editorial
- 20 Letters
- 30 Readers' Rides
- 145 Classified Ads
- 156 Grassroots Racing
- 168 What's New
- 193 Index of Manufacturers

COLUMNS

- 23 Inside Scoop
by Chris Chianelli
- 34 Pit Tips
by Jim Newman
- 40 Troubleshooting
by Doug Mertes
- 44 R/C Doctor
by Doug Mertes
- 51 Getting Started
by David Ditrner
- 194 Chris's Back Lot
by Chris Chianelli

THRASH TESTS

- 62 Roadrunner GTO & XPress
Testing the ROAR
Nats champ (and its little brother)
by George M. Gonzalez
- 68 Tamiya Honda CR-V
Stylish sport-ute
by Jeff Bartlett
- 78 Bolink All Star Legend
The legend gets outlawed
by Rick Eyrich



pg. 62

ON THE COVER

Top: the Tamiya CR-V proves it can climb hills with authority (photo by Jeff Bartlett); main image: a look at the winning cars (photos by Walter Sidas).

THIS PAGE

Top: American racers prepare to do battle at the Tamiya World Championships in Japan; middle: Tamiya's CR-V cruises the California beaches in style (photo by Jeff Bartlett); bottom: the Roadrunner tourers get set to tear up the tarmac (photo by Walter Sidas).

Ever Wonder about Winning?

WE'VE ALL wondered whether *we, too*, could win a national championship race if we had a factory-prepared "works" car. Surely, the pros have something that we can't get over the counter at a hobby shop—some one-of-a-kind chassis or a special widget that lets their cars float over the largest jumps and stick through the corners as if by Velcro®. This type of thinking conveniently allows us immunity from the perhaps harsh reality that knowledge and skill win more races than do unobtainable parts. Knowledge of driving, chassis setup, and of course, knowing how to "read" a track is a huge advantage.

So if you're smart, you'll win, right? Well, close but not *exactly*. Winning also requires meticulous chassis preparation—every suspension piece must work flawlessly, every gear must mesh perfectly. Dozens of championship-winning cars and trucks have passed through our offices throughout the years, and most were no more than perfectly prepared examples of the same kits we can buy at a hobby shop. The only difference was that they were expertly tuned and driven.

This month, we show you the cars of four world-class drivers: Mark Pavidis, Richard Saxton, Joel Johnson and David Jun. Each of these cars has recently won a big event, and we provide all of the gritty details so that you can duplicate their setups on *your* car. Now, go to the track and practice!

While we're on the subject of boosting your performance at the track, let's not forget about the unsung hero of R/C—the little Ni-Cd cell. Batteries are an R/C racer's best friends and should be pampered and treated with respect. In this issue, we take a look at the many available battery-discharge devices—from simple bulb dischargers to elaborate, microprocessor-controlled cell-management systems. Whichever type is right for your needs and budget, turn to our "discharger guide" to find out why you *need* one of these devices.

That's it for this month, and as always, keep those letters, phone calls and emails coming. Also, don't miss next month's issue when we'll reveal the results of the "Readers' Choice Awards." See you there.



Frank Masi, Executive Editor



Don't miss the Battery Discharger Guide on page 117.

Radio Control CAR ACTION

EDITORIAL

Group Editor-in-Chief TOM ATWOOD
Executive Editor FRANK MASI
Senior Editor CHRIS CHIANELLI
Editor JOHN HOWELL
Associate Editor GEORGE M. GONZALEZ
Editorial Assistant CYNTHIA WHITE

COPY

Copy Director LYNNE SEWELL
Senior Copyeditor KATHERINE TOLLIVER
Copyeditor JULIE GORDON
Assistant Copyeditor THOMAS J. HURLEY

ART/DESIGN

Managing Art Director ALAN J. PALERMO
Art Director BETTY K. NERO
Assistant Art Directors
MICHAEL BOUSE
ANGELA A. CARPENTER
MATTHEW A. CHIAVELLI
LESLIE COSTA
Staff Photographer WALTER SIDAS

MARKETING

Director of Marketing GARY DOLZALL
Marketing Manager DANIELLE RUGGIERO

CIRCULATION

Circulation Director NED BIXLER
Circulation Coordinator NANCY BENEDICT
Circulation Assistant JENNIFER CAPOSELLA

OPERATIONS

Director of Operations DAVID BOWERS
Production Assistant ARLENE MELKO
Image Technician CHRISTOPHER HOFFMASTER

ADVERTISING

Director of Advertising SHARON WARNER
Assistant Manager JILL ELLEN MOLINARO
Advertising Account Executives
TOSHA CRAWFORD
KATHY FARRELL
MONA TASSONE
Advertising Traffic Administrator SIRI A. WHEELER
Advertising Coordinator ANN T. WIEBER

PUBLISHING

Group Publisher LOUIS V. DeFRANCESCO JR.
Publisher YVONNE M. DeFRANCESCO
Associate Publishers
GARY DOLZALL
SHARON WARNER

CORPORATE

Chairman DR. LOUIS V. DeFRANCESCO
President and CEO MICHAEL F. DOYLE
Vice President G.E. DeFRANCESCO
Secretary L.V. DeFRANCESCO
Treasurer YVONNE M. DeFRANCESCO



Member Audit Bureau of Circulations

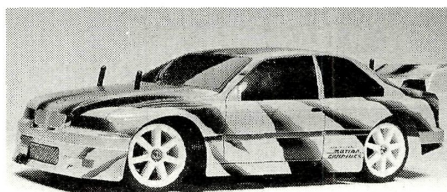
PRINTED IN THE USA



LETTERS

Paint By Numbers

I have been involved with R/C cars since I was just a kid, but when I entered college last year, I started to spend less and less time on my cars and more time on work and school. Well,



during this time, I also allowed my subscription to lapse—bad me! Anyway, I found a hobby shop that had all the back issues I had missed, and I came across your article about converting old, forgotten-about 2WD buggies into aggressive rally cars. Well, this was exactly what I needed, and after a few trips to the local hobby shop, and lots of money (had to have those extra hop-ups and tweaks), I now have the inner workings of a true race machine. I have always believed in doing everything myself; however, I couldn't put just any body on this car, so I came up with the coolest design that I have ever seen. The only problem is that I don't think that I possess the skills to paint it myself. What I was wondering was whether or not you knew of anyone who did custom paint jobs and what their prices or rates are. I have searched my

area, and no one is up to the challenge. Please help; who knows, maybe someday soon I will be in the pages of *R/C Car Action's* "Readers' Rides." Thanks for your time.

NICK BARBARO
via *Car Action* online

Well, Nick, we work exclusively with two excellent body painters, both of whom I have no qualms about recommending to anyone. The first is Scott Bich of Bich 'n Bodies. His number is (281) 485-0375. I highly recommend Scott. During the years that I've been here, I've never ever seen a bad paint job come in from Scott. He's one of the best, if not the best, body painter I've ever had the privilege to work with. Another person I think highly of is Richard Muise of Motion Graphics. Richard always comes up with unique, innovative paint schemes. Richard's number is (410) 848-0008. Give 'em a call, and they'll be able to give you info on rates as well as turnaround time. Good luck, and send us that photo when it's all done. *Doogie*

Reaching for the Sky(line)

I'd like to know where you got the Calsonic Skyline body for your TA03 as featured in the "Touring Car Shootout." (I am assuming that it is yours!) Does Tamiya make the car and sticker sheet as a set, or did you get a Kure Skyline body (I saw the number 556 decals on the car) and use the special limited-edition Tamiya Calsonic Skyline sticker set to do up this car? For your information, there were two Calsonic Skylines produced by Tamiya—a standard and a slightly modified version. Body differences were limited to stickers, most obvious

of which was the number plate, from 12 on the limited model to 1 on a standard production one. If the latter was what you had done, where did you get the sticker sheet from? Is it possible that the sheet came from Kyosho? Thanks.

LEON
via *Car Action* online

The TA03 shown in the "Touring Car Shootout" (January '97 issue) actually belongs to national champ David Jun. We needed an 03 for photos, and Dave's car happened to be in our possession. And what better example of Tamiya's latest chassis to have for testing than one that's as perfectly set up as Dave's?

The body shown in the photos is Tamiya's Nissan Skyline GT-R Kure (pronounced coo-day) painted Calsonic blue with various stickers from Tamiya's discontinued Calsonic Skyline GT-R body set (part no. 58135, if you can find one at a hobby shop). The 556 number decals are also from the Kure body set. *Frank*

Searching for Snakes

I am writing to ask if there is any more information available on Kyosho's Shelby Cobra (kit no. KYCO140)? I have searched high and low, but there is so little info floating around that I have gotten frustrated. Does it come in a non-pre-assembled kit? Are there any aftermarket parts? What is the darned thing equipped with? Is it a car designed for modification? Am I a schmuck for asking? These are a few of the questions that have been plaguing me ever since I saw the car at a local hobby shop. For years, I have been looking for an R/C model of the Shelby

Cobra; one finally comes out, and there's no info on it! Please, please, please will you help?

Thanks for keeping me rolling.
STEWART MCCULLOCH
via *Car Action* online

Don't feel like a schmuck!! Kyosho's Cobra is available, we believe, in Japan as an electric kit, but in the U.S., as a glow-engine-powered kit. We aren't sure which version goes to the Canadian market. The Cobra comes as either an unassembled, 4WD kit (Nostalgic Series) or as an electric sport kit (mostly pre-assembled) called the Mantis Series. With either version, you'll need a 2-channel R/C radio system, batteries and charger (for the electric version), or glow fuel and an igniter (for the gas version). As with all Kyosho cars and trucks, there's a huge number of factory and aftermarket hop-ups available.

If you're a Cobra man, check out Kyosho's newest Nostalgic Series offering: Peter Brock's famous Cobra Daytona Coupe. Gorgeous!

Frank

Shifty Readers

Is the HPI 2-Speed transmission legal for use in ROAR or NORRCA off-road 1/10-scale electric racing?

LANCE
via *Car Action* online

No, you can't use it in ROAR or NORRCA as far as I know, nor would you want to. HPI was very clear about their 2-speed being more for on-road use, as dirt tends to wreak havoc with any multi-speed, shifting tranny. Plus, the stress of landing from jumps and such would probably thrash a 2-speed pretty quickly!

Frank

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

INTERNET ADDRESSES: Frank Masi: frankm@airage.com
John Howell: johnh@airage.com
Chris Chianelli: chris@airage.com
George Gonzalez: georgeg@airage.com
Cindy White: cindyw@airage.com

In search of fun
and glory, 'cause
life's too short
to be a sheep • by Chris Chianelli

INSIDE Scoop



MIP & Associated

No strangers here

Personally, what's the first word that comes to my

mind when someone mentions off-road racing? ... Associated. But you know, when collecting those 15 world championships they're so proud of, and rightfully so, Associated has had help—help from companies making super-quality performance parts for the RC10; companies like MIP, which has been there for the duration getting those checkered flags right along with Associated. This having been said, it naturally follows that MIP would jump on the Dual Sport movement with their Shiny CVD™ (constant velocity drives) output shafts and Lite Drive output drives for the car. To those who have never tried MIP's Shiny CVD units: you might think about them for your next upgrade. They're super-smooth; true, so are some other output shafts out there. The thing I like so much about the MIP units is that they can be rebuilt. You don't have to buy a whole complete set when one part on one side gets worn—and all things eventually

wear out. The Lite Drives—available separately because the CVD units will work with stock Associated output cups—are manufactured of high-grade steel and lightened in every possible place without compromising strength integrity. For more information, contact MIP at (818) 339-9008.



R/C Collision Insurance

MRC says you can slam their off-road vehicles into a brick wall, smash them into the curb, run them off a cliff or even get them accidentally crushed under the wheels of a full-scale car; it doesn't matter. MRC will replace the broken parts (parts on their covered list) **FREE** of charge. Simply return the broken part(s) along with \$5 for postage and handling, and you're in business again. MRC's 1-year Crash Damage Protection is an unprecedented offer that tells you something about MRC's confidence about the ruggedness and dependability of their entire truck and buggy line. (Body, motor, radio components, speed-control assembly, tires and decals aren't covered.) Contact Model Rectifier Corp., 80 Newfield Ave., Edison, NJ 08818; (908) 225-2100; fax (908) 225-0091.

GRAPHITE GEARS

New from Trinity Products are these Zero Friction Super Spur gears for Team Losi's Double-X, Double-XT, Double-X 'CR' and Double-XT 'CR.' The new 48-pitch super-light gears are made of a graphite-filled composite material that makes for a stronger tooth design, which also is more resistant to chipping under rough off-road conditions. According to Trinity, the new gears run very quietly and are available in the sizes currently used by racers Brian Kinwald and Greg Hodapp—84- and 87-tooth, 48-pitch Zero Friction Losi spur gears. For more info, contact Trinity Products Inc., 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.



Available in ribbed, too!

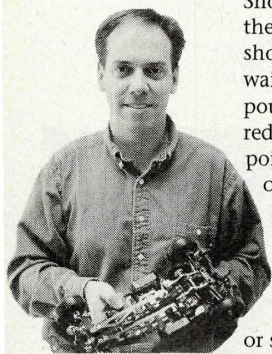
Shown here are the first of a new Pro-Line series of off-road tires that feature a completely new carcass design—one that will maximize Pro-Line's new M3 rubber compound. The new carcass features a smaller radius sidewall with reinforcing ribs for less flexing, so the tires won't shift from side to side during hard cornering.

The first tread patterns to be offered on the new carcass are the "Bow-Tie," which, as its name states, resembles a piece of uncomfortable, formal neck-wear, and the "Holeshots," which look like a slightly larger version of Pro-Line's Square Fuzzie tread.

The Bow-Tie was developed to work especially well on "marble" tracks—hard-packed tracks that have scattered bits of loose dirt on their surface; you know: the kind of tracks that make you wish you had something between a Fuzzie and a step-pin tire, but generally make you nuts instead!

The Holeshot slots between a Square Fuzzie and a mini-pin tire, and it's a less "temperamental" tread than the Square Fuzzie, as it will still work well on blue-groove tracks that have a little loose surface dirt. Although shown here in truck-tire form, both the new carcass design and the new tread designs will soon be available in buggy form. For more information, contact Pro-Line at (909) 849-9781.

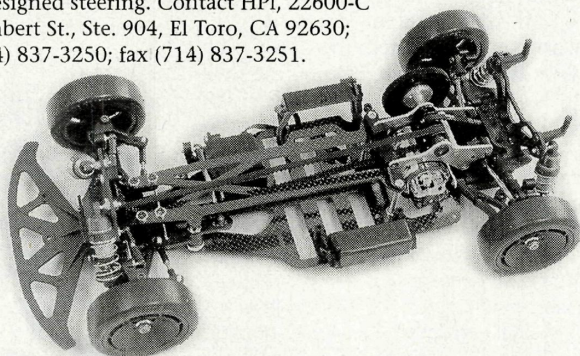
INSIDE **scoop**



THE PRO WITH THE PRO

Shown here is Kent Clausen with HPI's hottest new version of their much respected RS4 sedan racer. This "Pro" edition should be hitting the shelves right about now, so there's no wait if you want to get yours. With narrow, belted, pro-compound slick tires mounted on new 5-spoke wheels, a redesigned front suspension with revised upper link pick-up points and suspension arms (narrowed at the outside instead of the inside), a gearless, 2-belt drive system, hard-anodized shock bodies, full graphite and ball bearings, ball diffs at both ends, a one-way center shaft, and universal drive shafts on all four corners, this 4WD car has everything you'll need to do some serious "lot-rodding" this season.

Also new is a chassis design that accepts either saddle-pack or stick-type batteries. The Pro also features smoother, redesigned steering. Contact HPI, 22600-C Lambert St., Ste. 904, El Toro, CA 92630; (714) 837-3250; fax (714) 837-3251.



It's Here!



We've been talking about it, but up till now, you haven't seen it. I'm talking about Novak's Profile software for the Novak Cyclone ESC. Now, with an IBM-compatible PC, you can adjust the parameters of your Cyclone. Things like: neutral, full-forward, full-brake, PWM frequency, brake-blipping value and much more. For more info on this revolutionary product, see our review of the Cyclone in the February '97 issue of *Car Action*, or contact Novak Electronics Inc., 18910 Teller Ave., Irvine, CA 92612; (714) 833-8873; fax (714) 833-1631.

TRINITY

ZERO

\$3.99

Our 128
Tooth Spur
Is Lighter Than
Most 100 Tooth
Spur Gears!

No, no, wait ... I mean HPI.
Yea that's it ... HPI, HPI, HPI

Hey! Let me guess. Right about now, you're saying, "Chris, are you feeling OK? You already ran the 'Scoop' on the RS4. Are you crazy, or lazy?" While I could understand your questioning whether I suffer from either of these personality defects, the truth is I simply screwed up and cited the wrong manufacturer (whose name I will not mention again) for the RS4. The manufacturer of the RS4 is HPI! Not that other company, which is also, by the way, a very respectable organization, but simply not the manufacturer of the HPI RS4. I hope this doesn't degrade your perception of my greatness. I'm allowed, after all, to make a mistake once a decade, am I not? (Frank and George make several a day.)

To make it up to HPI (the true manufacturer of the HPI RS4) and HPI's Kent Clausen, who was so gracious on the phone when I delivered the bad news, I'm going to re-run the Scoop in its entirety. I told Kent and anyone else at HPI (true maker of the HPI RS4) that it's OK if they want to refer to me as lazy, crazy screw-up Chris, as long as they realize that I still am THE RULER, MASTER-BLASTER, DA-BOMBI, KNOWER OF EVERYTHING THERE IS TO KNOW ABOUT EVERYTHING! (unlike Doogie who knows nothing about anything! But I must give credit where it's due, Doogie at least knows he knows nothing about anything. I respect that). Anyway back to me ... AND ... AND I'M ALSO THE COMPLETE UNDERSTANDER OF ALL THINGS NATURAL AND UNNATURAL AND ... AND ... AND MAKER OF THE BEST HERRING-FILLED NORWEGIAN-NOUGAT TACOS AND, AND, AND, AAAAAHHHHHHH!!!! ...

RS4 evolution

In the relatively short time HPI's RS4 has been around, it certainly has earned a favorable reputation for itself on the "lot circuit." That's why it should come as no surprise that a



nitro version is now being offered. The new Nitro RS4 comes with a .12-size, pull-start, Nitro Star engine and muffler. It can be built wide or narrow, so all HPI bodies will fit. Standard high-performance features include: oil-filled shocks, fully independent suspension, front and rear belt drive, HPI Super Radial tires and a disk brake. A full supply of high-quality HPI hop-ups are in the works, so you'll

be able to customize your Nitro RS4 if you're so inclined. How do a Nitro Star .15 engine and a 2-speed tranny sound for starters?

"Nitro-eater" is not the only evolutionary path the RS4 is trying to tread. Owing to an environment of enthusiast favor, the RS4 is making a go of it in the "wild kingdom" of the truck. Contact HPI, 22600-C Lambert St., Ste. 904, El Toro, CA 92630; (714) 837-3250; fax (714) 837-3251.

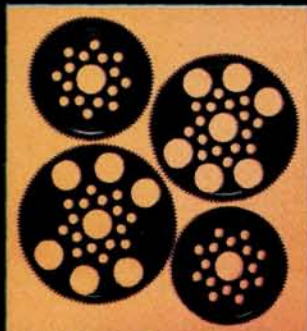


Also new from HPI is this concept Beetle body designed to fit all "M-scale" chassis.

FRICTION

SUPER GEARS™

- New Super Low Drag Narrow Tooth Design •
- Graphite Filled For High Tooth Strength •
- Super True, Super Light, Super Quiet •
- 84 & 87 Tooth Sizes For Losi XX-CR & XXT-CR •
- 95, 100, 120, & 128 Tooth For On-road Racing •
- Dual Diff Ball Holes For Stealth & Corally Diffs •



INSIDE scoop



It's even Raid-resistant!

The Cyber Buggy™ could be the wildest bug body ever offered. I find its sleek shape most interesting—that much is certain. With its chopped top and sleek racing fenders, the Cyber Buggy fits the RC10T2 tight and low. I guess you could say this is a squashed bug. With minor body-mount modifications, this aerodynamic insect will fit many off-road cars and trucks like the Nitro Hawk, Clod Buster, USA-1, Outlaw Raider and Stadium Blitz. Cyber Buggy features: a roof scoop that can be open to direct air onto the motor; molded-in "whale-tail" spoiler; optional bolt-on racing spoiler; split rear windows; sun roof; molded-in trim-lines; and headlight and taillight decals. Available in both rough-use heavy-duty and lightweight racing versions. Contact Dahm's Racing Bodies, P.O. Box 360, Cotati, CA 94931; (707) 792-1316; fax (707) 792-0137.

PARMA EXCELLENT NEWS!

Listen, I know, there are a lot of touring-car tires and wheels out there, but before you skip to the next Scoop there a few things you really need to know about Parma's tires and wheels. While it's true they feature zero-flex, 5-spoke sports-design wheels and the tires are made of real-rubber, high-grip compound, here's the best news: the firm inserts and sidewall design make these tires resistant to "shoulder-fold-over"—something that sedan tires are susceptible to. But wait, there's even more better news—the most bestest news of all! (OK, OK. I know there are no such words. I can't wait to get the nasty letters from your English teachers). You get a full set (front and rear) that includes tires, wheels and inserts for a retail of only \$28.95. Excellent news! For more information, contact Parma Intl., 13927 Progress Pky., North Royalton, OH 44133; (216) 237-8650; fax (216) 237-6333.



NEWS BRIEFS

by John Howell

World Champ Switches to Trinity

Recently, IFMAR On-Road world champ, Great Britain's David Spashett, switched from Team Corally/Team Orion to start racing for Team Trinity. John Howell (our Sluggie at Large, otherwise known as Doogie) got a chance to catch up with David, and we conducted a mini-interview regarding the switch:

Doogie: So David, why the decision to switch over to Trinity's race team?

DS: Mainly for a new challenge and the chance to work with new people. Trinity offers a very professional attitude, and I believe that together we will enjoy great success.

Doogie: What advantages do you think you'll have gained having switched?

DS: The main advantage will be the support and knowledge available to me from the team. Also the chance to further my experiences by racing more abroad.

Doogie: Who do you see as your major competitors both in Europe and worldwide?

DS: There are plenty of excellent drivers around the world, but a few do stand out. One of the best has to be Masami Hirotsaka, and then there are people such as Joel Johnson, Brian Kinwald, Mark Pavidis, John Orr, Josh Cyrul, Barry Baker and Mike Blackstock. In Europe, there are also some

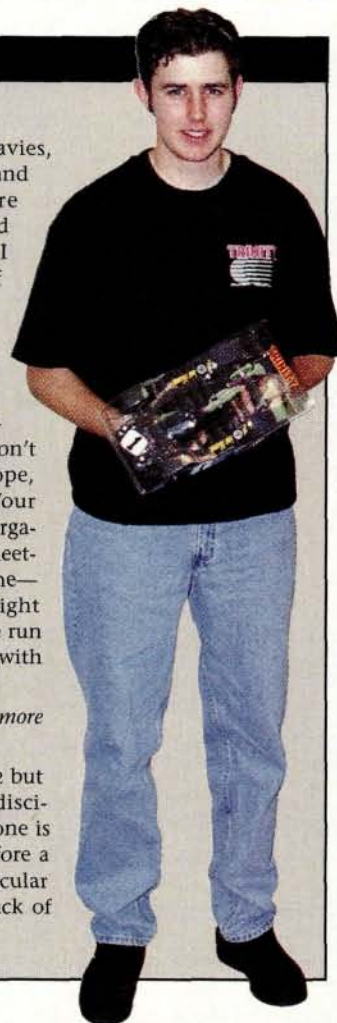
excellent drivers like Phil Davies, Oscar Jansen, Andy Griffiths and Eric Jonk. These people are always there ready to win and are all great competitors. I would never discount any of them to win the meeting.

Doogie: Is there a major difference between racing in Europe and the United States? If there is, what is the difference?

DS: There are a few differences between racing in America and Europe. The first is we don't allow Paragon [traction additives] in Europe, and you race 4-cell a lot more than us. Your track layouts are much the same, and your organizers do allow a lot of practice before the meeting. We only allow a very little practice time—maybe one practice time and then go straight into qualifying. Our meetings themselves are run very similar but are compacted into one day with four qualifying rounds and one final."

Doogie: Which category will you concentrate more intensely on?— $\frac{1}{10}$ or $\frac{1}{12}$ scale?

DS: Both $\frac{1}{12}$ and $\frac{1}{10}$ scale. My favorite is $\frac{1}{12}$ but in the summer, I do like racing $\frac{1}{10}$. The disciplines for the scales are very similar and so one is not a lot harder to drive than the other. Before a big meeting, I try to practice for that particular class as much as possible, but due to the lack of meetings in England, it can be difficult."



"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the seventh annual "Readers' Rides of the Year Contest" in the fall of 1997. The winner will be awarded \$500 and an assortment of electronic R/C equipment furnished by Novak Electronics Inc. Our second and third choices will also receive an assortment of Novak electronic R/C equipment. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!

LOW RIDER

Eddie Hwang of Seoul, South Korea, converted his Tamiya TA01 Skyline into this sharp-looking TA02 Supra. In addition to the basic conversion, he has hopped it up with an HPI rear lowering kit, Tamiya front shock tower, universal drive shafts, full ball bearings, adjustable camber, Trinity motor, working headlights and fog lights, Celica wheels and a custom-built exhaust made out of a perfume bottle. He powers his car with a Novak Explorer speed control, Polaris receiver and Futaba Magnum Jr. radio. This low-riding, hopped-up racer must roar down the straights and corners with four on the floor. Nice job, Eddie!



SSSSSMOKIN'!

Karsten Hviid of Birkerød, Denmark, sent us this photo of his "Smiling Sussie" hot-rod. This Parma Hemi Coupe chassis is topped off with a combination of the Coupe body and the Hemi Sedan—for a sizzling scale appearance. Karsten upgraded the stock Z-bend tie rods and the spur gear, and the car is powered by a Kyosho Mega motor and Traxxas reversing speed control. Not only does this ride look smokin' on its own, but Karsten's stellar photography also has the edge on the competition!



PACKAGE DEAL

It looks cool, and it drives even better! With its dynamite setup, Rick Shipman's Custom Works Enforcer 10 gathers speed and race results. He uses an Associated Stealth transmission, Raborn telescopic drive system and Lunsford titanium turnbuckles. He powers the car with Futaba radio gear, Tekin electronics and World Class cells. Nothing like an all-in-one package.



NISSAN 300ZX, PART 2

It doesn't look much like the one Ken picked up Barbie with in the full-size Nissan 300ZX commercial, but Rob Turner of Fremont, CA, painted his Tamiya 300ZX to look as true to scale as possible. A participant in the hobby for 10 years, Rob plans to race this 4WD beauty in the near future. For winning performance along with scale looks, he has equipped his ride with a Trinity T-Tech 12-turn triple motor, Tamiya carbon-fiber drive shaft and front one-way diff and HPI Super Slick tires up front. He controls the car with a Novak T-1 ESC and Futaba Magnum Jr. radio.



READERS' rides

BLAZING BUGGY

Jason Bauer of Orland Park, IL, sent us this picture of his weathered Kyosho Inferno MP-5. He fires his dirt-destroying buggy with an O.S. .21 RZ-B engine and uses a K&N air cleaner and a Futaba Magnum T2-PD radio. Judging by its battle wounds, Jason is blazing trails with this ride.

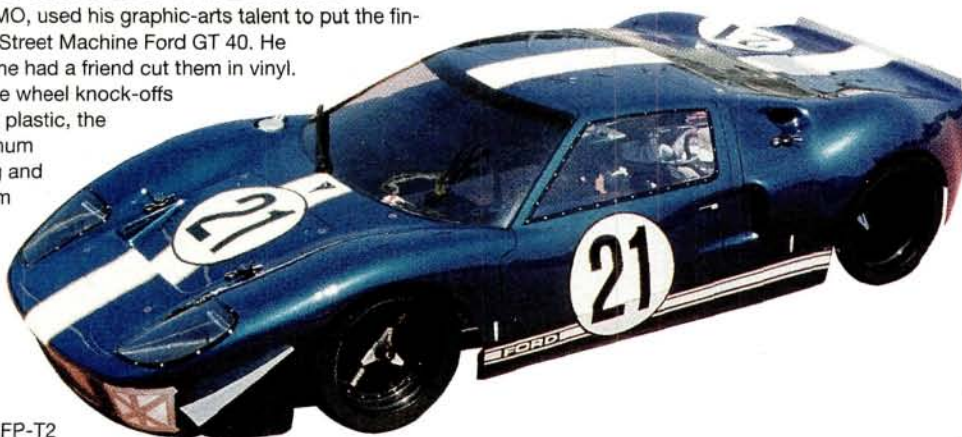


DELIVERING THE GOODS

Not only does Edward Carolipio's FedEx minivan have an original, eye-catching look, but it's also hopped up to deliver true racing results. Edward started with a Tamiya M-chassis with a FWD setup, then he added an HPI Suzuki wagon type-R body and modified the chassis with a Tamiya ball-bearing kit, ball diff and aluminum heat sink, Kose Super Steering set and HPI wheels and radial tires. To make his deliveries on time, he powers the van with a Tekin G-12C ESC and FM micro receiver, Airtronics Caliber 3Ps radio and a Hitec 605BB high-speed servo. Like its full-scale brother, Edward's van delivers results on time, all the time!

GRAPHICALLY DESIGNED

Clint Sims of St. Joseph, MO, used his graphic-arts talent to put the finishing touches on his HPI Street Machine Ford GT 40. He designed the decals, and he had a friend cut them in vinyl. He also custom-crafted the wheel knock-offs from K&S brass and sheet plastic, the rear body pins from aluminum sheeting and the rear wing and front downforce wings from scrap Lexan. In addition to all his custom work, Clint outfitted his ride with a Trinity Midnight motor, Pro-Line wheels and tires and a Kyosho GT 40 body. He drives the car with a Novak 410-M5 speed control and Futaba FP-T2 NBR radio.



AN OLDIE, BUT A GOODIE!

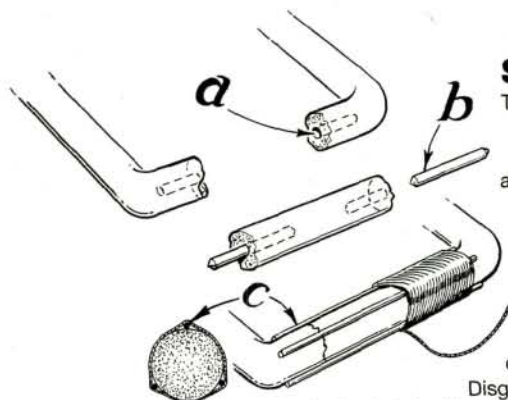
David Smith of Manchester, England, sent us this photo of his Schumacher Cougar 2. He says that although the car is old, through hard work, he and his son still achieve winning results. They've equipped the Cougar with a Parma 13-turn double, Nosram F1 ESC and Schumacher mini-pin tires and 5-spoke wheels. They drive the car with Futaba radio gear and run it on Trinity cells. It just goes to show, when it comes to racing, the driver is at least as important as the car!

NOVAK
ELECTRONICS, INC. RACING TEAM



PIT TIPS

by Jim Newman

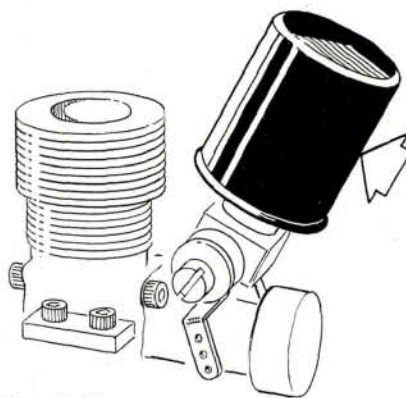


Splints

To repair broken plastic components, drill holes into the ends (a) and attach wire dowels with CA (b). Reinforce the repair in highly loaded areas with three wire rods glued and bound and threaded to the outside of the repair.

Disguise the repair (c) with smoothed on black silicone sealer.

CURTIS BROOKS
N. Las Vegas, NV



Dust Cover

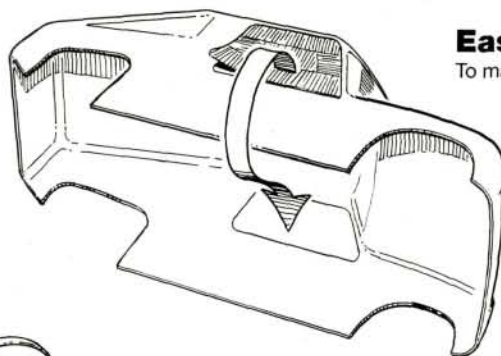
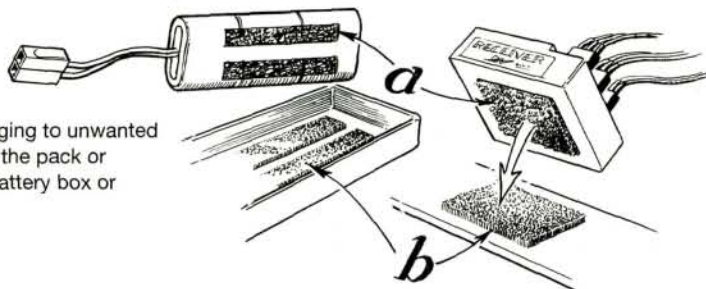
Place a 35mm film canister over the foam intake filter to protect it from pit dust when the car is not running.

ROBERT DOLINSKI
Winnipeg, Manitoba, Canada

Non-Stick Trick

Use Velcro® to mount battery packs, receivers and controllers. To avoid parts clinging to unwanted surfaces, be sure to put the "furry" piece on the pack or receiver (a) and the "hooked" piece on the battery box or chassis (b).

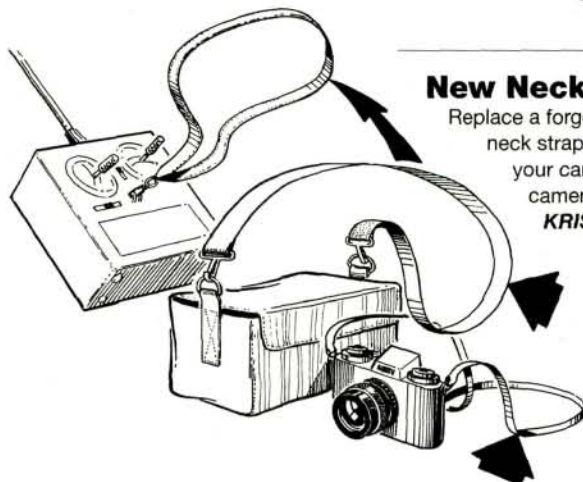
MATT LAMBRECHT
Herman, CA



Easy Masking

To make window masking, trim the tape to the proper size on the outside of the body, peel it off and place it over the window on the inside of the shell. Repeat the process on the opposite window.

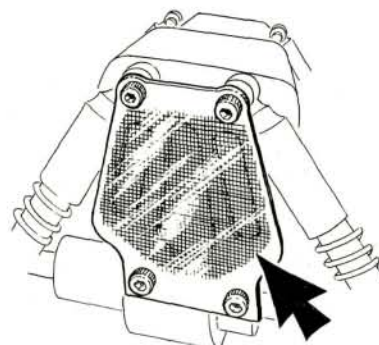
RICKY GATELY
Lexington, TN



New Neck Strap

Replace a forgotten transmitter neck strap with the one from your car tote bag or a camera case.

KRISTOFFER KLEMM
Nittedal, Norway



Private Screening

To keep dirt from kicking up inside your chassis, glue glass-fiber screening to the rear of the shock tower.

ROBERT GUNNING
Laporte, IN

(Continued on page 39)



PIT TIPS

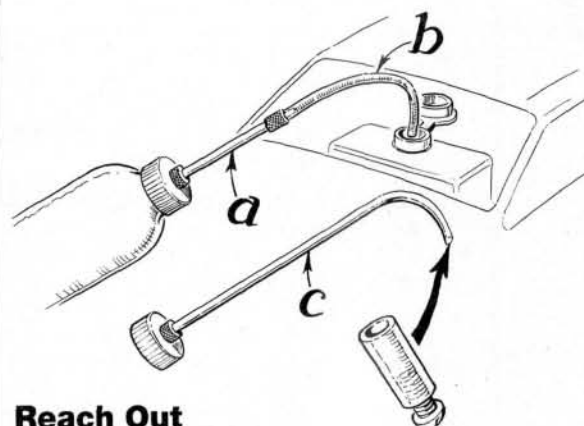
(Continued from page 34)



Touch-Up Kit

Make at-the-track paint touch-ups by toting small quantities of paint in cleaned nail-polish bottles. The application brush works great for small paint repairs.

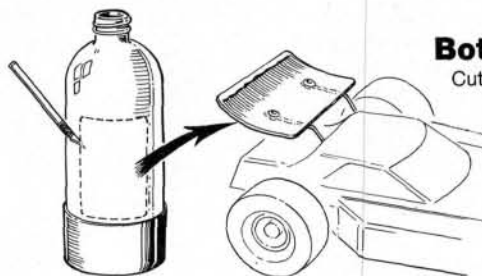
TYLER HERRON
Brownfield, TX



Reach Out

Extend the pouring tube (a) of your fuel bottle while increasing its flexibility (b) by replacing the rigid tube with a length of rigid nylon pushrod (c). Curve the end in the hot blast from a hair dryer.

LEE BARNES
Bedminster, Bristol, England



Bottled Spoiler

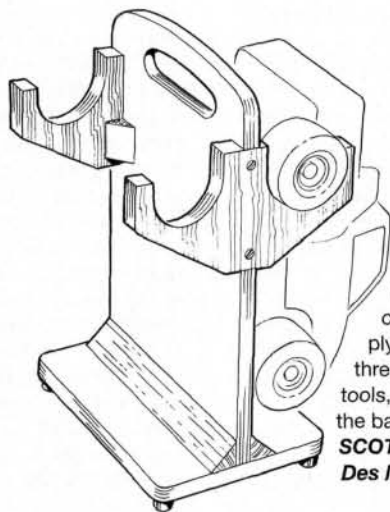
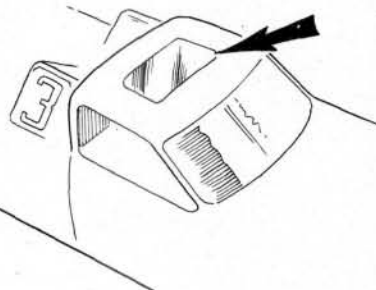
Cut spoilers from clear-plastic soda bottles. Experiment with different-size bottles of varying curvatures for more or less downforce. Paint the clear plastic to match your car.

BEN WAGNER
Dubuque, IA

Sunroof

Give your ride a sunroof by masking off a clear panel on the top of the body shell before painting. Do not cut the roof, because it will badly affect the shell's rigidity and could cause cracking at the corners of the roof window.

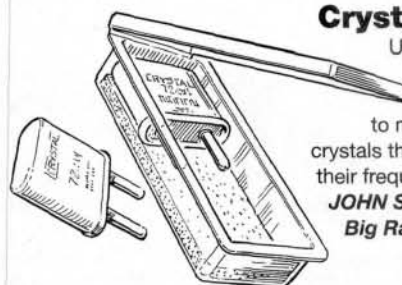
WESTEN NELSON
Dickinson, ND



Vehicle Tote

Cut this car caddy from $\frac{1}{2}$ -inch (13mm) or $\frac{3}{8}$ -inch (9mm) thick construction-grade plywood and attach the three pieces. To carry tools, add walls around the base.

SCOTT INGERSOLL
Des Moines, IA



Crystal Caddy

Use a clear plastic X-Acto blade case lined with a thin layer of sponge to make a caddy for your crystals that allows you to see their frequencies.

JOHN SPARKS
Big Rapids, MI

Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.



TROUBLE SHOOTING

by Doug Mertes

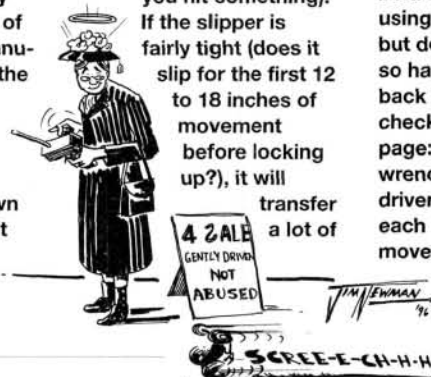
Dude, it's your Diff!

I have a recurring problem with the tranny in my RC10. So far, the differential bolt has sheared off at the head three times. I drive the car normally (without any undue stress), and I run a stock motor. I usually keep the slipper fairly tight, but not bottomed out. The transmission was assembled following the instructions to the letter, including the diff bolt tightness. Is this a common problem? Is there a stronger bolt I could get?
TONY ALAFOUZOS
via email

Wow, Tony. Three times? That's gotta be a record! I must admit, I was really stumped about this one. I

talked to a bunch of my off-road friends about your problem, and I couldn't find anyone who had ever had the diff-bolt head shear off. I took apart a Stealth tranny on the bench down in my secret underground lab, reassembled it according to Associated's instructions, and I think I may have found the cause of your problem. The manual tells you to tighten the bolt until it bottoms out, and then to loosen it a specified amount. My guess is that you tighten it down too far, to make sure it really bottoms out. When you do that, you actually stretch

the threads at the top of the bolt. If the bolt were made of a softer metal alloy, it would probably be OK. Because Associated uses a high-quality hardened bolt, however, the head weakens and will pop off when stressed (going over a bump or jump, or when you hit something). If the slipper is fairly tight (does it slip for the first 12 to 18 inches of movement before locking up?), it will transfer a lot of



If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at Radio Control Car Action, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.

drive-train stress down to the diff assembly, and poof—there goes the diff bolt. Reassemble the diff using a new stock bolt, but don't crank it down so hard. Before you put it back in the transmission, check the diff for slippage: insert an Allen wrench or a small screwdriver into the slot in each drive cup, and try to move the diff gear. If it doesn't slip, you should be OK.

Find the Right Vector-Vectra

About two months ago, I entered my very first race in the Tamiya Championship Series in California. It was extremely challenging, especially for someone who had never raced before! Unfortunately, I had major difficulties driving my HKS Opel Vectra. The car wouldn't go straight; instead, it danced like crazy back and forth, as if the back tires didn't grip the asphalt very well. Even

ran over the turn marker, and that made it look as though I were cheating. It was very embarrassing! I think I've invested in the proper equipment, with a Futaba PCM radio, Tekin G-12C speed control, aluminum shocks, accessory springs, soft tires, bearings and other hop-up parts. How can I set up this car properly, so that my next race will be better?
ANTHONY WIJAYA
Arcadia, CA

Anthony, look on the bright side: at least you can blame your equipment! I assume that your Opel is a FWD chassis, not a 4WD car, but in either case, the setup rules are pretty much the same to start with: eliminate binding, put the soft stuff (tires, springs, oil) on the end that's experiencing traction problems and check the

ride height. You're right in suspecting that traction is the culprit here, and it may have several causes. You mention that you use the aluminum shocks and soft tires, but you don't specify which springs, shock oil, or pistons you use. Start by going back to the kit shock absorbers (even the hot drivers like their smooth action). Pick up four bottles of high-quality shock fluid (in 20, 40, 60 and 80 weights), and take a day or so to practice and find out what happens when you change the shock fluid, pistons, or springs. Make only one change at a time, and keep a small notebook in your pit to record what you did and the effect it had.

You also mention softer tires: which end did you put them on? Did you use foam liners with them? FWD cars are notoriously sensitive to tire compounds, and you

should use different compounds on each end of the car. Soft ones up front give you lots of steering, but they may make the car very twitchy, especially down the straights; if the rear shocks are set up too stiff, that will make things worse. Soft tires in the back will slow down the steering and make the car seem less twitchy, but they may not give you a sufficient steering response for the tighter portions of the track. Try not to use soft tires all around. Finally, on a level surface, check the ride height. Basically, the lower end of the chassis wants to do all the steering. If the back end of your car is lower than the front, that would also explain some of your trouble. Take this chassis tuning thing one step at a time; pretty soon, people will be coming over to see why your car handles so well!



SHOCK OIL FOR TOY CARS! NOW I'VE HEARD IT ALL.....

worse, the car wouldn't turn as well as I would have liked. Instead of making a small tight turn entering the infield, the car



Frustrating Fuel Leak

I've been running my new Kyosho GP-10 Spider basically stock except for the O.S.-A5 glow plugs, HPI Viper body and 20-percent Blue Thunder fuel. I believe I've been having fuel-pressure problems: every time I go into a hard right turn at about half a tank, the engine dies. I even tried driving without the body to see whether I could figure out how the fuel starvation is happening! If I can get the engine started again, it dies once more at about a quarter of a tank. I tried replacing the muffler pressure line with thicker airplane fuel tubing, but the engine still dies. What can I do to get full run times?

PATRICK FOLTS
Mountain View, CA

Ah, the pleasures of running a gas-powered vehicle! I must admit that although they do offer extended run times and ferocious acceleration, they also manage to confuse us poor owners from time to time. You would think that a simple thing like fuel flow would just happen all the time, wouldn't you? Patrick, I think you're on the right track when you talk about fuel-tank pressure.

It doesn't sound like a problem with the lower end (like a leaky bearing seal, or a carb problem). My guess is that you've got a pinhole leak in your fuel tank. When the tank is full, you don't notice the pressure problems because it doesn't take much to pressurize the tank. Once the tank is half empty, however, the exhaust-line pressure is insufficient to overcome the air leak. I suggest that you drain and remove the fuel tank, fill it completely with a mixture of water and dish detergent, block off all but one line fitting (you can fit short lengths of hose that are clamped shut) and pressurize the tank with a small compressor or air bottle. You'll see bubbles where the tank leaks. If you're lucky, you'll be able to fix the leak with some two-part epoxy, Shoe-Goo, or RTV. If not, you'll have to replace it. If the car is really that new, you should contact Great Planes about replacing the tank if it's defective. Good luck!

Get Ready to Rumble

I have an Associated RC10ST off-road truck. I use a Futaba Magnum Sport, and I've installed a Novak Duster Sport speed control and a full set of bearings. A new off-road track has opened near my house, and I'm considering racing, but I'm concerned about whether I have the right equipment. For instance: should I buy Associated Team shocks? One of my shocks leaks now, but I just bought a rebuild kit. Can I just buy the newer shock bodies to upgrade my truck? Will they leak as much?

PJ ASPESI
Smithfield, NC

Welcome to the wonderful world of off-road racing, PJ! I guess that more people race trucks in the dirt than participate in any other segment of our hobby, so I'm sure you'll find that there are lots of other truckers to compete against. Your RC10ST is a fine vehicle right out of the box. In fact, it's on a par with the trucks that were winning national championships only a few years ago. Because they'll reduce rolling friction and make your transmission run much more smoothly, the bearings are a good idea.

The Novak Duster can handle just about any motor and battery combination that you would put into a truck like that, especially if you limit yourself to 6 cells. As far as the upgrade to Team shocks goes, I would hold off for a while. Go ahead and rebuild all the shock bodies, even if only one is leaking. If you do that, you'll know that all four of them will be good for another season of fun. Instead of spending the money on the shocks, pick up several sets of springs, a couple of bottles of silicone shock fluid and two or three sets of pistons. Take the time to learn how to tune the shocks you have, and you'll be miles ahead of your competition at the buzzer. If you have money left, look into buying an alternative set or two of front and rear tires. Don't just buy what looks cool; wait until you find out what the fast guys are running—and doing well with—before you plunk down your cash. Finally, don't forget to practice, practice, practice! Ask any pro-level racer, and he'll tell you that track time is the best performance investment you

can make. Now go out there and win!





Parking Lot Essentials

THE FOLLOWING is a guide to what you absolutely, positively must have to run well when the asphalt wars heat up. To research this article, I went through all the stuff that I normally take to a race, plus I dumped out the contents of pit bags that belonged to some friends who have also been doing this for a while.

Let's start with the radio. If you run in multiple classes, it's worth it to look at a radio with a memory that can hold settings for several cars. These tend to be high-end FM or PCM units, so they're not cheap, but they will help to eliminate control problems caused by glitching and interference.

Parking-lot tracks are often surrounded by chainlink fencing, and they contain lots of vans, both of which can be murder on AM-type RF signals. Check out your vehicle a couple of times before the big day, and make sure that everything works before loading up and heading for the lot.

Are there any extra parts that you should make sure to take along? Some cars and trucks have a few parts that break easily, and it's a good idea to pack spares, especially since you might not be able to borrow or purchase the ones you need if they break. For instance, I always carry an extra pair of front steering spindles for my Tamiya* TA-02 car and a set of front suspension arms for whatever F1 car I might be racing.

SNEAKERS

A lot has been written about different types of tires for parking-lot vehicles and for good reason: a tire change will produce the single most dramatic handling alteration you can make to your car or truck.

Here's an example: a friend was having awful traction problems at the last race of the year in late September. He had tried all sorts of tuning tricks, but nothing would make his car behave. I lent him a set of Jaco/Pro-Line* White compound rears and Purple compound fronts for his Tamiya F103 car, because that's what was working well for me that day on my 101 chassis. Not only did it help him to hook up, but he also beat me in the Main!

Take along two or three sets of foam tires if you run in a class that permits them (our club allowed foam tires in the Mini class late last year, and they made a huge difference in

handling), because traction can change as the day wears on, let alone from week to week. You'll almost certainly need some sort of traction compound on those foam tires (available from companies such as Paragon*, Trinity* and Bolink*). Those lucky enough to use real rubber tires should take along at least one alternate set of footwear for their cars. I frequently wind up using different tires on the front and rear, whether they're slicks and radials, wides and narrows, or just softer and harder rubber compounds. Consider the application of a traction additive like Trinity's Buggy Grip 2 on your older tires if you need more traction or if it's a little cold or overcast on race day. Try using some on the inside edges of the front tires if you need a little more steering, but be careful,

because too much can make your vehicle squirm and slide under power.



Keep a couple of sets of tires handy; these slicks and radials provide different levels of grip for different conditions.

EXTRA BODY

Different bodies result in handling changes that you can use to your advantage. Sedan bodies that have a steeply sloped front end (like a Mercedes) will usually produce more steering than ones with blunt, vertical faces (like a BMW). A short body, like an older Skyline GT-R or a Blitz

Toyota Supra, is better-suited for a short, twisty track with a lot of turns, while a longer body like a newer Kyosho* or Tamiya Nissan Skyline

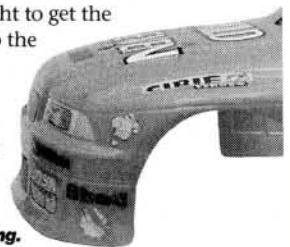
works well on long, high-speed circuits when you want the car to be harder to turn and a little more sure-footed.

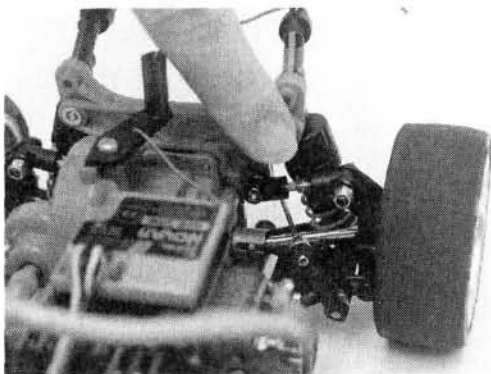
Manufacturers are now supplying multiple rear wings as aerodynamic options on some of their newer offerings. HPI*, Protoform*, Elite* and Frewer* all offer short and tall wings for some of their bodies, although, sometimes, you can mix and match ones from different manufacturers. I always keep the wings from my older sedan bodies that have become too battered to use on the track. They're

almost always reusable and, some times, they fit another body that gets used later in the season. You might also try to raise the existing wing a little by using some longer mounting bolts and short spacers or lengths of rubber fuel tubing. Sometimes, all it takes is a few millimeters of extra wing height to get the thing into the airflow where it will do you more good.



This Mercedes body (left) provides more front-end traction than the BMW body on the right. A sedan body with a slanted front end usually results in additional steering.





Adjustable camber links should be your first upgrade if your car doesn't already have them.

CAMBEROSITY

The solid, non-adjustable steering linkage and upper suspension links that come with many cars work well only in limited circumstances. If you start auditioning different types of tires, or get involved with a bumpy or slippery parking lot, you may need to adjust the length of the camber link. While Kyosho, HPI and other companies make upscale, race-ready cars that come with adjustable camber links right out of the box, Tamiya's popular TA02 and newer TA03 cars don't. This would be the first upgrade I would make to one of these sedans, especially if I was going to lower the car or use

tires different from those that come in the box. For \$15 or so, adjustable camber-link sets are inexpensive, especially when you consider the enormous handling changes you can incur with a few turns of a turn-buckle.

Are you finding that your tires' inside edges are wearing faster than the outside edges? Lengthen the upper links a turn or so, and you'll find more traction and even tire wear. Got a bad push going through the infield? Try shortening the upper links on the rear a little, and you'll reduce some of the rear-tire contact patch. Sure, the tires will wear a little funny, but you'll be able to swing the back end around real purty through the switchbacks and S-turns without letting up on the throttle, while your competition has to slow down just to make it around the turns without hitting the walls. That's how you win races!

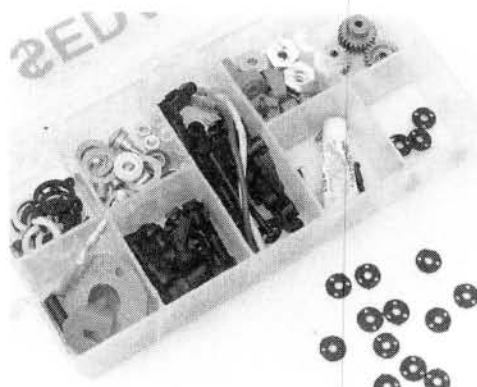
SHOCK-O-TRAUMA

You should have all the parts to tune the shocks on your car or truck. For instance, most sedans come with one or two alternate sets of shock pistons (you still have them, don't you?), and you'd be amazed at the difference a piston change can make when you're having a hard time getting the back end of your car to hook up. I use a compartmented nylon box for each class I'm racing in, so all I do is grab the box that says "Mini" when I'm running that class on a Sunday morning.

Of course, you'll also need various weights of shock oil to go along with the pistons and shock springs in a variety of ratings. Here's a money-saving tip: while the optional spring sets from Kyosho and Tamiya work well, Associated's* short shock springs cover a wider variety of conditions, because they come in both softer and harder versions than the ones from your sedan's original manufacturer. The black springs, which are the original equipment on 10L and 10LSS cars, work wonders on really slippery parking lots at the beginning of the season or after a hard rain, while the gold springs, which came standard on older RC10 off-road buggies, do a great job of eliminating oversteer on tracks

with a lot of traction. As an added bonus, these springs only cost \$2 a pair.

Always buy name-brand shock oil. All of them do the job, whether it's Trinity, Associated, or Losi*. Just make sure to pick up enough of it in a wide variety of viscosities (from 20 to 90WT), and you'll do just fine. Silicone-type fluid is best, because it tends to retain its viscosity rating whether it's hot as blazes or still pretty chilly.



Don't throw away the extra shock pistons that come with your kit! For easy reference, keep them and other small parts in a compartmented nylon box. To meet every tuning challenge the parking lot can throw at you, you'll need the pistons, shock springs and fluid.

TEAM SECRETS

ESC PROFILE SOFTWARE PART 2 OF 2

The Novak Profile Software (#1030) allows for adjustment of nine operating parameters of the Novak Cyclone speed control. Last issue you were introduced to six of the programmable features. We now pick up where we left off, and explain three more features as well as the Drag Brake Toggle.

BRAKE PWM FREQUENCY: Controls deceleration characteristics of the R/C vehicle with respect to brake trigger movement. Higher Brake Frequencies require more initial trigger movement to obtain a given amount of braking – making a light vehicle brake more controllably, and a heavy vehicle brake less reactively during initial braking. Lower Brake Frequencies require less initial trigger movement to obtain a given amount of braking – making a light vehicle harder to control under initial braking, and a heavy vehicle more reactive to initial braking. With the Novak ESC Profile Software, there are 16 Brake Frequencies to choose from.

DRAG BRAKE VALUE: Defines the amount of Drag Brake applied within the Deadband when the throttle trigger is in the Neutral position. When the Drag Brake Value is greater than zero, Drag Brake is applied in the Deadband area. Therefore, when the throttle trigger is returned to the Neutral position, braking information is sent to the motor. This function can be used to obtain Drag Brakes without shifting the Neutral position of the transmitter with the throttle trim, and in turn eliminate the Deadband space before throttle can be applied.

DRAG BRAKE TOGGLE: ON/OFF feature that switches the Brake Pot of the Cyclone ESC from Minimum Brake adjustment to Drag Brake adjustment. When the Drag Brake Toggle is turned ON, Drag Brake is applied in the Neutral/Deadband area, and the Brake Pot on the Cyclone will adjust both Drag Brake Value and Minimum Brake to the same value. When Drag Brake Toggle is turned OFF, the Brake Pot on the Cyclone adjusts the Minimum Brake Value (Drag Brake Value can still be set with the computer to obtain Drag Brakes).

DRAG BRAKE FREQUENCY: Controls deceleration characteristics of your vehicle with the Drag Brake during Neutral/Deadband. The Drag Brake Frequency affects the Drag Brake only when the Drag Brake Toggle is OFF. Increasing the Drag Brake Frequency makes braking more subtle during Neutral/Deadband. Decreasing the Drag Brake Frequency makes braking more reactive. With the Novak ESC Profile Software, there are 16 Drag Brake Frequencies to choose from.

The Novak Profile Software is available at your local hobby dealer!

LIST PRICE – \$59.95

NOVAK ELECTRONICS, INC.
18910 Teller Avenue, Irvine, CA 92612
• (714) 833-8873 •

Advertisement



GETTING STARTED

by David Ditner

Understanding Speed Controls

IN A FULL-SCALE car, you control its speed by slamming; er, I mean pressing the gas pedal. In short, the farther the gas pedal is pushed, the more gas goes through the engine and the faster the car goes. R/C gas cars work in much the same way, but what about electric cars? Electric cars require a device to regulate the flow of electricity to the motor. If not for speed controls, we'd be wide-open all the time—hey, there's a thought! This month, we're going to discuss the speed control, from the mechanical (servo-operated) type you get in a kit to the high-tech, solid-state electronic units. At the end of the article, you'll be able to differentiate among the speed-control types and understand the advantages and disadvantages

of each type. You'll also be able to properly set the mechanical speed controls for optimum performance.

MECHANICAL SPEED CONTROLS

Entry-level electric R/C cars come with either a mechanical speed control or no speed control at all. The cars that don't include speed controls are typically racercars intended for use with an electronic speed control (ESC). The typical mechanical speed control, like the kind that comes with Tamiya*, Kyosho* and Traxxas* kits, uses a servo-operated rotary switch and multi-stage resistor system to provide variable speed. The power from the battery is reduced, or dissipated, through the resistors in the form of heat. The faster the speed, the lesser the resistance and



Certain entry-level radio systems come with basic electronic speed controls that are relatively inexpensive. If you look around, you might find a decent radio system with a speed control included.

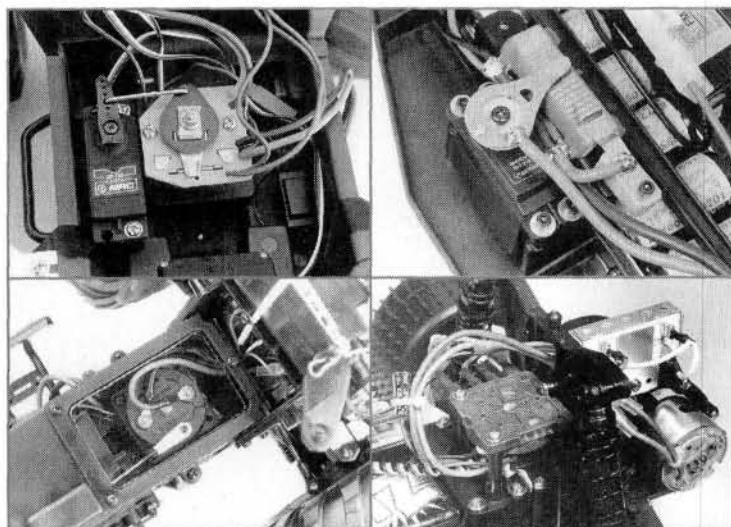
heat; the slower the speed, the more resistance and heat. (Speed is healthy.) This system will usually supply three speeds forward and three speeds for reverse. To stop the vehicle, you must slam the car into reverse. This can have obvious negative effects on tranny gears. Team Associated* and Team Losi* sport vehicles supply a rheostat-type speed control with forward and brakes. While this type of control doesn't come with reverse, it does provide for more proportional speed and brake because it simply has more steps (speeds) in both directions.

Mechanical speed controls are cheap, and they adequately handle the current flow of the stock motors included with the kit. They aren't, however, very efficient in terms of run time because the power from the battery pack is literally wasted (turned into heat) when the vehicle is at less than full speed. Furthermore, if you intend to run evil modified motors, plan on buying many spare resistors and/or entire speed-control units. Because of serious current flow—as much as 25 amps—the mechanical speed con-

trols are typically the weak point of R/C vehicles, i.e., they require a lot of maintenance. Some kits include switch lube to keep the speed-control contacts in good shape. Understand that this stuff is a lot like grease and will attract dirt and other undesirable abrasives to the heart (speed center) of your R/C demon, if it's not completely sealed from the elements or cleaned frequently. You must keep a mechanical speed control clean and properly adjusted.

To set the mechanical speed control for optimum performance, inspect it to make sure that the wiper arm goes to full speed with no resistance in both directions. Also, make sure that the wiper doesn't pass the full-speed setting. If this happens, the car will temporarily lose power, and it may even get stuck in full-power position. Obviously, this can have negative effects on the well-being of your car.

Adjust your throttle trim so the car doesn't move when you're not pulling the trigger. Test the neutral setting by holding the car up in the air and giving it forward



Here are a few examples of different mechanical speed controls. Clockwise from top left: a three-step mechanical speed control, a resistor/wiper-arm mechanical speed control and two versions of rotary speed controls. The one on the left is a Kyosho rotary controller; the one on the right is a Traxxas controller.



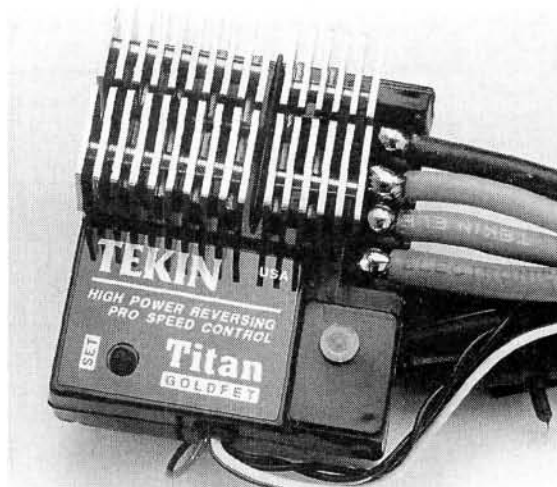
GETTING STARTED

speed, then return to neutral (let go of the trigger). If the wheels stop spinning, you're halfway there. Now, still holding the car in the air, do the same for reverse. Repeat this a couple of times until you're comfortable with the neutral setting.

Check all plugs on the unit, and make sure they're tight, especially to the resistors. Loose connections cause heat and wasted energy. Not using all available energy to propel your vehicle into ludicrous speed is simply a tragedy. Remember—speed equals joy!

FETs change voltage without dissipating the unused power into heat, and they're more efficient, giving you more run time. ESCs supply much smoother and proportional throttle response, because speeds aren't limited to the number of resistors.

There are various types of speed controls from many manufacturers on the market today. Many folks like a speed control that has reverse. It comes in handy when the car is nose-in against a curb and you're 30 feet from it. You can buy pistol-grip



There are even ESCs available with reverse. This reversible Tekin unit can handle more abuse than most entry-level ESC.

Most of the forward-only ESCs will handle quite nasty modified motors. They are typically more efficient (they have the least voltage drop) than basic ESCs. Many of the newer speed controls have regenerating technology that actually turns your motor into a generator of sorts when it's rolling (coasting) but not drawing power. Some of the upper-end ESCs even have current limiting, or torque control for controlling holeshots! Novak*, Tekin* and LRP* generally make the real topnotch racer-type ESCs.

One of the newest fields in ESCs is the high-zoot, mega-modified, reversing speed controls. Tekin has the Rebel, a reverser that handles down to a 10-turn motor, and their Titan is great for dual-modified-motor monster trucks.

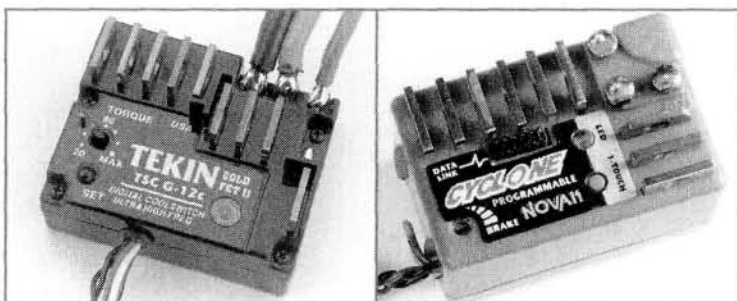
There are a couple of caveats concerning ESCs. First, water is extremely harmful to an ESC, so take extra care to not to get it wet. However, avoid sealing an ESC in a bag or balloon to waterproof it. All this will do is cause the ESC to overheat and shut down—or worse! Also, some speed controls aren't

fuse-protected. So if you accidentally plug the battery in backward, it's poof-city, so be careful. ESCs are rated by power-handling capacity. Before you invest in one, determine what motor will propel your vehicle, and make sure the ESC can handle it. Ask the R/C car expert at your local hobby shop for advice.

FLICK OF THE SWITCH

Typically, ESCs come with their own switch that turns on both the main power battery as well as the radio system. Mechanical speed controls normally do not

(Continued on page 183.)



When you're ready to race, most ESC manufacturers produce an all-out "racing only" unit. These two from Novak and Tekin are designed from the ground up to take punishment from the hottest batteries and modified motors.

ELECTRONIC SPEED CONTROLS

Electronic speed controls (ESCs) are a wonderful addition to any R/C speed machine. They control the speed functions of an R/C car, but instead of a servo-operated wiper/resistor system, ESCs are one-piece, solid-state units with no moving parts. They greatly reduce the amount of wires and plugs in the vehicle, making for a cleaner installation. While the mechanical speed controls use resistors to drop voltage, ESCs use FETs (field effect transistors) to regulate power to the motor.

In short, the FETs work by rapidly switching power to the motor. The

radio systems that include a nice reversing speed control from Futaba*, JR*, Airtronics* and Hitec*. Some can even handle nasty modified motors down to 13 turns! Check with the manufacturer's specs before you toss in a hot motor, though; you don't want to blow up your new ESC before you get a chance to even run it. If you can afford one of these systems when you buy your first R/C car, do it; it's well worth the extra couple of bucks.

Racers usually opt for the ESCs with forward and brakes only. In most sanctioned racing, using reverse is illegal, and increased proportional braking is more desirable.



Nowadays, most ESCs (even entry-level units) feature some form of a one-button setup. The One-Touch Set Up on this Novak ESC makes it easy for a new-comer to the hobby to tune it to his radio system.

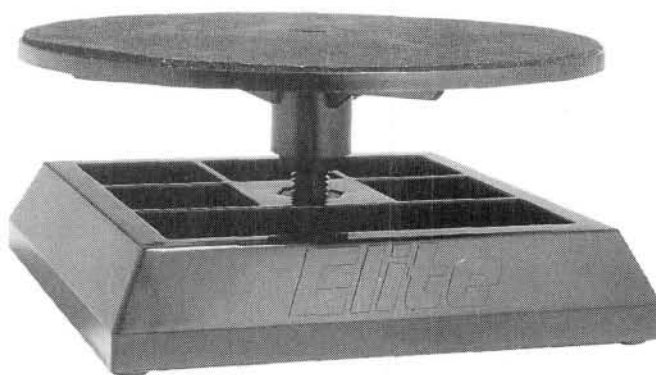
PRODUCT WATCH

TOOLS TO TIRES—
REVIEWS OF THE
LATEST R/C
ACCESSORIES

Elite Car Stand

*The Return
of the Turntable*

by George M. Gonzalez



HERE'S A dandy little product that I love so much I just have to tell you about it. It's the Car Stand by Elite*. I know; what's so special about a car stand? Well, here's the deal. The Elite Car Stand is the first one I've seen that has a circular, turntable-type platform. This is a really handy feature

because it allows you to rotate your car or truck instead of picking it up and repositioning it to obtain better access to a particular area on the chassis.

The platform may also be raised and lowered to fit a variety of R/C vehicles: lower it to work on touring cars and raise it to work on off-road racing trucks.

This versatility makes the Car Stand suitable for all $\frac{1}{10}$ -scale vehicles and some lighter $\frac{1}{8}$ -scale on-road vehicles. The

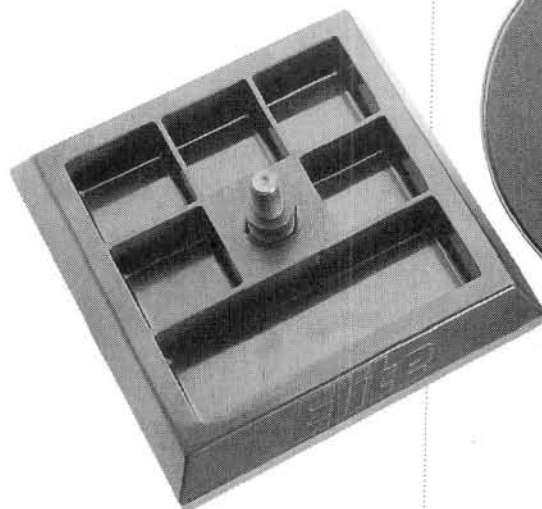
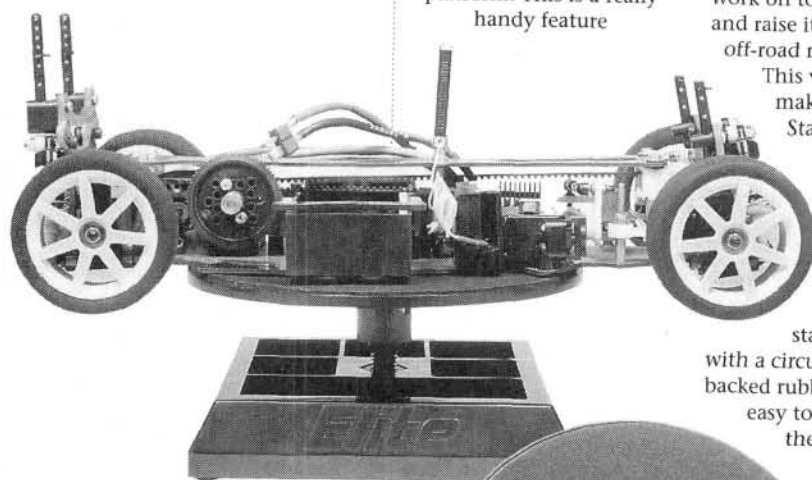
stand comes with a circular, adhesive-backed rubber pad that's easy to install on the platform.

The rubber makes a great non-slip surface to work on and does a great job of protecting your car's or truck's chassis from being scratched.

The base is made of durable, ABS plastic and is fairly heavy, so the stand feels very solid. In the base are six compartments that are great for storing parts of all sizes.

Of course, let's not forget the Car Stand's most amazing feature—its price. This little dandy may be snatched up for less than \$15!

So if you're in the market for a car stand, or you're looking for a great gift for that R/C'er in your life, look no further; the Elite Car Stand is sure to satisfy everyone who owns one.

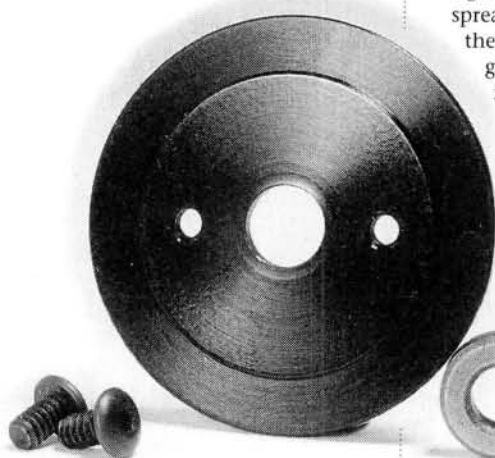


Lower left: with the turntable removed, the six storage compartments are visible. Just flip the turntable over, screw it down, and you have a fully enclosed parts box. The rubber pad on the turntable protects your vehicle—no more scratched and dinged chassis.

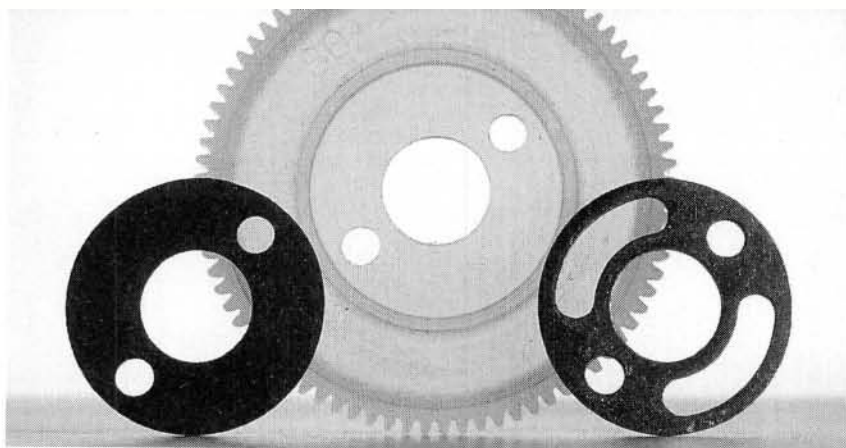
Above left: this Yokomo YR4 looks right at home on this car stand. Because its height may be adjusted, the Elite Car Stand will accommodate just about any $\frac{1}{10}$ -scale on- or off-road vehicle. Heck, it will even take most $\frac{1}{8}$ -scale buggies, too.

Robinson Racing 'Absolute' Spur Gears

Silent Running
by Frank Masi



Above: this Absolute T2/B2 spur-gear adapter is lighter than the stock unit and, according to Robinson Racing, it also allows the spur gear to ride on the bushing, which reduces gear run-out. **Right:** an Absolute adapter is also available for the Team Losi Hydra Drive system (shown on the Absolute gear on the left).



The Robinson Racing Absolute spur gear comes with a rubber gasket to reduce vibration and noise (left) as well as an aluminum "load spreader" (right) that prevents the gear from being distorted when the mounting screws are tightened down.

A GEAR'S A GEAR—right? That's what I used to think, but when Robinson Racing* sent a batch of their new Absolute machined spur gears, I became enlightened. The Absolute spur gears are different from other gears in that they have an aluminum "load-spreader" that prevents the gear from being distorted when its mounting screws are tightened. The load spreader is isolated from the gear by a rubber gasket that, according to Robinson, quiets gear noise by limiting the vibration that can resonate throughout the transmission and gear cover.

The accompanying note from owner Rob Robinson said "Try 'em out, and call me if you like them." Who was I to argue? The Absolute spurs are avail-

able in three groups "speed" (80 to 83 teeth); "power" (84 to 87 teeth); and "punch" (88 to 91 teeth) and were designed primarily to be bolted to the Associated Stealth transmission. Installing an 83-tooth gear on my Losi Double-X 'CR' buggy required Robinson's gear adapter (sold separately), which allows the Absolute gear to mate with Losi's slipper and Hydra Drive system.

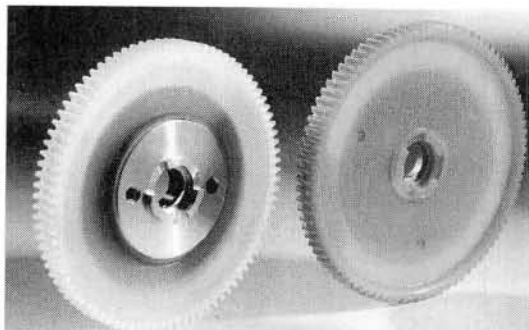
The adapter set consists of a black-anodized, aluminum slipper-clutch plate along with a special load-spreading plate that keys to the Hydra Drive. Both plates sandwich the spur gear, and the entire assembly is held together with two small screws. There's a slight weight penalty when using this system instead of the one-piece Losi gear, but it's negligible, especially in modified-class racing. When installed on an Associated B2 or T2, however, the Absolute gears themselves—

complete with load-spreading plate—weigh about the same as most one-piece molded gears. If you install Robinson's "improved" gear adapter for the Associated B2 and T2, you'll actually save a little weight.

What I like about the Absolute gears is that its offset places it closer to the tranny's motor plate so there's less output-shaft deflection during operation (when meshing, gears want to push themselves apart; the closer the gear is to a supporting bearing, the less it will be deflected). Also, pinion gears can be installed perfectly flush with the end of the motor shaft—no more pinion overhang or setscrews that barely grab the motor shaft.

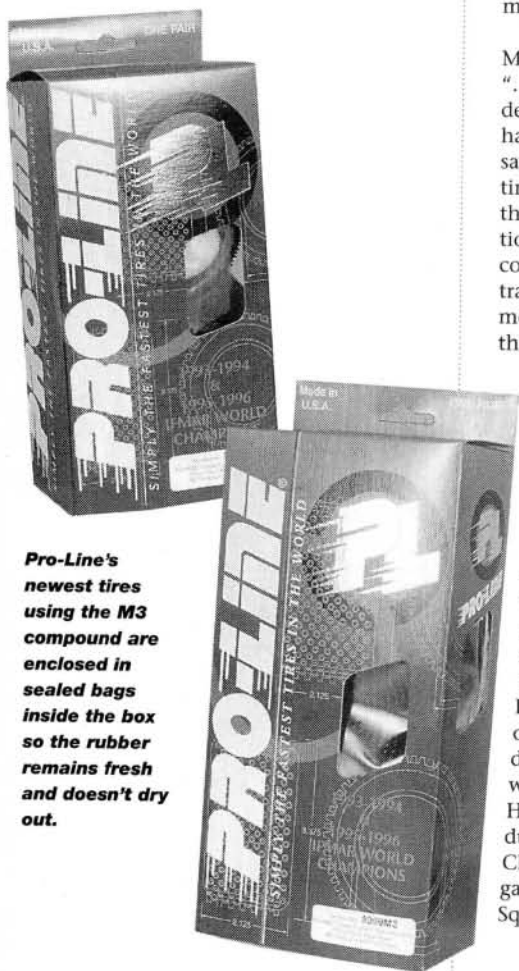
I ran the Absolute gear with one of Robinson's new hard-plated steel pinions, and I can verify Robinson's claim that these gears quiet the car significantly. Also, they're among the most concentric gears I've yet tested; you can set the mesh very tightly without binding.

All in all, Robinson Racing has come out with a pretty original product that does exactly what its manufacturer claims.

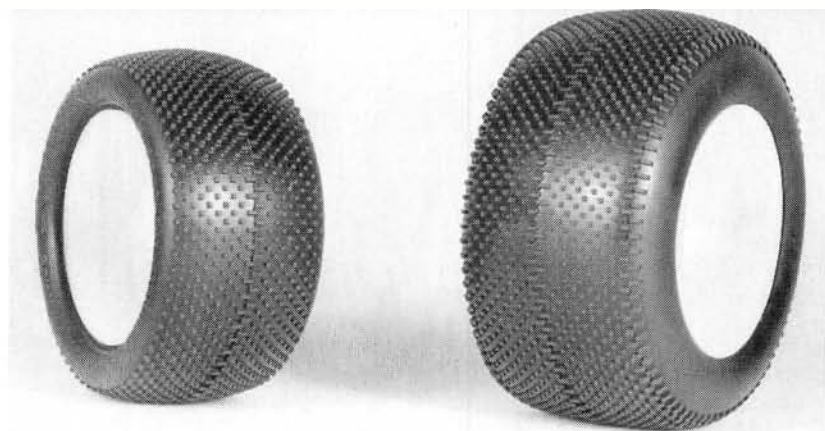


Pro-Line M3 Tires

*Soft Recipe for
Traction* by Frank Masi



Pro-Line's newest tires using the M3 compound are enclosed in sealed bags inside the box so the rubber remains fresh and doesn't dry out.



Tread patterns such as these Fuzzies benefit the most from the new super-soft M3 compound. Both buggy (left) and truck (right) tires are available in M3 compound.

JUST WHEN I thought they couldn't make tires that were any stickier, along comes Pro-Line* with its new M3 rubber compound (a successor to M2, which came after XT-R, which I think came after XT-M on the "softness scale"). Actually, M3 is not intended as a replacement for M2 but as something to try when you absolutely must have more rear bite.

To be more specific, M3 came about "... because today's tracks demand better tires that have more adhesion," says Tim Clark, Pro-Line's tire engineer. Really, as the "blue-groove" condition has become more common at off-road tracks, traction is affected more by the stickiness of the tires than by the type of tread. You'll remember that a blue groove is formed on hard-packed tracks by actual rubber deposits from tires. Under these conditions, even severely worn tires still work well as long as they're made of soft, sticky rubber.

During testing, Pro-Line found that most of its current tire designs work better when molded of M3. Here's a personal story: during the '96 Cactus Classic race, Tim Clark gave me a set of four Square Fuzzie tires—full-

width rears and "home-made" narrow fronts—for my Predator 4WD buggy (see review and race in the September '96 issue). At the time, I was told that the tires had been sprayed with Associated Traction Action. The tires worked great, but while I was researching this article, Tim revealed that the tires he gave me were, in fact, molded of M3 and hadn't been "sprayed" at all. Sneaky guy. In fact, Pro-Line maintains that because M3 is so soft, none of the Team Associated drivers (who do most of the testing for Pro-Line) feel the need to treat them with any chemical traction additives.

Recently, I and the rest of the *Car Action* staff had the chance to test some of the new M3 tires at our favorite indoor venue—Long Island Raceway in New York. The L.I. track is very hard-packed and develops a decent blue groove—perfect for M3. Compared with M2, M3 definitely provided greater forward bite (for better acceleration and control), but it actually caused some "push" during sweeping turns. That's why I must emphasize that M3 isn't for all conditions; on certain tracks, some drivers will prefer M2 tires to M3 to allow their cars to "drift" through turns. For most of us, especially novices,

there can *never* be enough rear traction, in which case, M3 delivers bucket loads of bite.

Other issues that have to do with super-soft tires are sidewall flex and tire distortion. Under cornering loads, soft rubber tires tend to become severely distorted; in other words, they "squirm" all over the place, and that is why we use foam inserts. With super-soft tires such as M3s, current foam inserts are actually inadequate for some conditions. To address this, Pro-Line has developed new, larger and more rigid foam inserts that will be included with M3 tires. Currently, Pro-Line offers all of its Square Fuzzie, Fuzzie, Stubbie, Step-Pin and Mini-Pin tires in M3 (in addition to M2) for both trucks and buggies. Tires with smaller spikes, e.g., Fuzzies, seem to work the best with M3, although according to Pro-Line, the performance of their Stubbies and Step-Pins is also improved with M3. In addition, we'll soon see some completely new Pro-Line tires that will be designed specifically to maximize the effectiveness of the new rubber compound. These tires will feature new, stiffened sidewalls and will have a rounder body to improve, among other things, bumpy-track performance.



Left: the yellow on the contingency cluster decals changed shades when it was applied to the silver portion of the body. **Below:** the scalloped spoiler adds a nice touch to the rear of the Grand Prix. I used 4-40 screws to attach the spoiler.



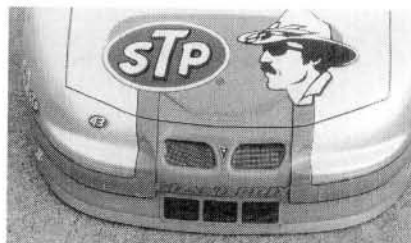
Scaling down Petty's #43 Anniversary Car

Slix Decals

Protoform '97 Grand Prix

Tru-Match Paint

by Kevin Meyer



Above: the stripes on the front bumper gave me the most difficulty. It would probably be easier to mask them off and paint them. Use Tru-Match Petty Red (RC no. 3014). **Below:** I did some minor surgery on the rear panel graphics to make them flow smoothly over the quarter panel.



NEEDED A FRESH LOOK for the '97 race season? The most drastic modification you can make to your R/C car—not only visually, but aerodynamically—is to add a new body. Often, revised body styles are available to the R/C hobbyist before the public can buy the full-scale version. This means that R/C'ers have an ever-increasing selection of the latest and greatest to choose from.

I always enjoy the start of a new race season. It brings out all the current trends in body styles, paint schemes and graphics. This review is a triple score for you readers, as it covers three new products that will help you replicate your favorite NASCAR heroes' cars.

• **'97 Grand Prix body shell**—part no. 1214. This is Protoform's* latest addition to its line of highly detailed polycarbonate bodies. The silky-smooth body lines and scale accuracy are this company's unmistakable trademarks. The only change I don't like is that the body and rear spoiler are formed as one piece. Previously, the spoiler was included as a separate piece. Now that it's part of the body, it's more of a task to trim out the rear of the body.

• **Tru-Match* paints.** Now that you've chosen a new

body, it's time to pick some new paint and graphics for your ride. Enter Tru-Match, a new manufacturer in the R/C industry. The company originally set out to produce enamel spray paints for static models. Just recently, they developed a line of R/C paints. At this time, the color selection is limited, but the colors they offer are right on the money for matching the paint schemes of full-scale racers. I'm doing Petty's no. 43 Anniversary car, and the color match is as close as you can get without having a custom shop mix up a patch of paint. To duplicate the no. 43 Petty Blue, use RC no. 3013.

• **Slix Decals*.** Having crossed over from 1/24-scale models, Slix Decals has been involved with 1/10-scale models for a year now. They have a great selection of NASCAR decal sets that will impress any race enthusiast. The graphics' scale is right on. Most of the sets are geared toward getting the novice to the track fast and making a car look good with minimal effort. Packaged in two-sheet sets, the kit includes everything you'll need: car numbers, contingency clusters, major sponsor logos, window netting and more. Instructions for correct decal placement and color scheme also come with each set.

Applying the stickers

was easy, except for the stripes that are wrapped around the front bumper. The Mylar the decals are printed on did not respond well to the "hairdryer method." When I tried to make relief cuts in the Mylar, the neon orange ink used on the stripes cracked and splintered. The colors on the decal sheets look good, although the yellow seemed to change shades when it was applied to the silver body. For this project, I used the 25th Anniversary set (2005-RC/9643-A).

FINAL THOUGHTS

Protoform has an excellent selection of bodies for on- and off-road. My complaint about the spoiler reflects my personal preferences. The way the shells are produced does not affect the looks or performance at all. I hope to get a chance to work with Tru-Match paints again in the near future. The choice of colors may be slim, but they can't be beat for that hard-to-find shade of paint. I've always been a sticker/decal freak, and Slix is off to a great start in the 1/10-scale graphics business. They have an impressive list of complete sticker sets. A change in printing ink and Mylar (vinyl would be great) could help this company really take off.

*Addresses are listed alphabetically in the Index of Manufacturers on page 193. ■



thrash TEST

1/10 scale electric

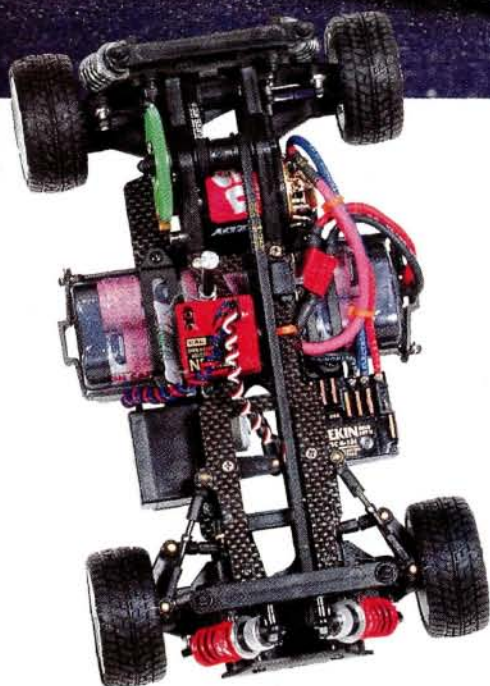
ROADRUNNER GTO & Xpress

by George M. Gonzalez

ALREADY A dominant force on parking-lot tracks all over Southern California, the Roadrunner Xpress touring car (top left) and GTO 962K Mini Sedan (bottom left) are tough acts to follow. Exclusively imported by GHI* in Orange, CA, the Xpress and GTO 962K include a long list of special racing features that will impress even the most hardcore racer.

In 1996, six ROAR and NORRCA touring car national championships were awarded; the Roadrunner Xpress captured four, and the GTO 962K managed to nab one. Their successful track records alone shouldn't influence your purchasing decisions, though; talk to someone who owns one and ask what he or she thinks about it. Better yet, count how many of these cars end up on the A-Main roster at the next big parking-lot race.

Not much more needs to be said at this point except: look out, 'cause there's a new kid in town and he has a nasty little brother.

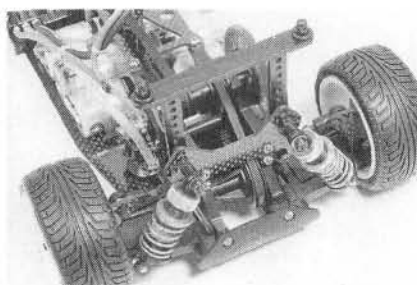


BIG OR SMALL? YOUR CHOICE

The Xpress is a 1/10-scale touring car chassis while the smaller GTO 962K could be considered either 1/12 or 1/10 scale, depending on the body you choose for it. In other words, if you mount one of Elite's* new BMW M3 Mini Sedan bodies on the GTO, it will be considered 1/12 scale. If you install a Tamiya* Rover Mini Cooper body—or any other M-chassis body for that matter—the car will be considered 1/10 scale. I know; things are starting to get a little confusing. Because these cars share so many parts, including all the major drive-train components, I decided to review both at the same time.

KIT FEATURES

Both the Xpress and GTO come with an abundance of carbon-fiber parts (the upper and lower chassis plates and front and rear shock towers). The Xpress also includes some trick carbon fiber and black-anodized aluminum rear hub carriers that are really hot (not included on the GTO). Both cars have a set of high-quality ball bearings, silky smooth front and rear ball diffs made from a super-light material, front and rear universal swing shafts, twin belt 4WD systems, low-CG (center of gravity) motor mounts, ultralight oil-filled micro shocks and unique, rising-caster-rate front suspensions—an impressive list of features!



The Xpress's rear end features really trick half-graphite/half aluminum rear-axle carriers.

The cars are obviously different sizes, but they also differ in other ways: the Xpress includes an aluminum heat-sink motor mount; the GTO has to make do with a molded plastic unit, but Roadrunner does offer an aluminum one as an option. I really like both cars' motor-mounting systems because the motor's pinion gear mates with the spur gear from underneath it—not from the sides as it does on most other available touring cars. This allows the motor to be mounted low on the chassis, and that keeps the CG as low as it can be.

The Xpress uses a direct-drive center-point steering system, while the GTO gets a more conventional steering bellcrank system. On the Xpress, the steering servo is mounted vertically like those on the high-tech F1 cars. The downside is that you have to remove the servo's mounting ears to install it.

Testing the ROAR Nats Champ (and its little brother)

ROADRUNNER—XPRESS

SCALE 1/10
LIST PRICE \$385

DIMENSIONS
Length overall 14.5 in.
Wheelbase 10.25 in.
Width (F/R) 7.25 in.

WEIGHT (RTR) 3 lb., 2.8 oz.

CHASSIS
Type Upper and lower plates
Material Carbon fiber

DRIVE TRAIN
Type Twin-belt 4WD
Primary Pinion/spur
Transmission Universal drive shafts
Differential(s) Front and rear ball diffs

Slipper clutch None
Bearings/bushings Bearings

SUSPENSION (F/R)
Type A-arms with adjustable upper links
Damping Coil-over, oil-filled shocks

WHEELS
Type (F/R) One-piece plastic
Dimensions (DxW)
Front 1.875x0.75 in. (mid-narrow)
Rear 1.875x1 in. (standard)

TIRES
Type (F/R) Soft-compound radials
Width (F/R) Mid-narrow/standard

ELECTRICS
Motor, battery, ESC Not included

ROADRUNNER—GTO 962K

SCALE 1/12 or 1/10
LIST PRICE \$325

DIMENSIONS
Length overall 13.5 in.
Wheelbase 8.25 in.
Width (F/R) 6.25 in.

WEIGHT (RTR) 2 lb., 12.6 oz.

CHASSIS
Type Upper and lower plates
Material Carbon fiber

DRIVE TRAIN
Type Twin belt 4WD
Primary Pinion/spur

Transmission Universal drive shafts
Differential(s) Front and rear ball diffs
Slipper clutch None
Bearings/bushings Bearings

SUSPENSION (F/R)
Type Lower arm w/adjustable upper link
Damping Oil-filled, coil-over shocks

WHEELS (F/R)
Type One-piece plastic
Dimensions (DxW) 0.875x10.68 in.

TIRES (F/R) Soft-compound radials

ELECTRICS
Motor, battery, ESC Not included

Both cars accept stick-type battery packs and have a very nice battery-fastening system that allows access to the battery from either side of the chassis. In addition, for the utmost in handling, the Xpress allows you to run racing-style saddle packs. During most of my tests, I ran it with stick packs, and I was thoroughly impressed with the way it handled. I then switched to saddle packs and found a "night and day" difference. Which battery system do I prefer? Let's just say I will never go back to stick packs.

The cars' twin-belt 4WD systems are about as smooth and friction-free as you can get. The systems seem very conventional in design, but each is mounted in such a way that there's no need for friction-causing belt tensioners. For both cars, Roadrunner offers an optional, one-way, center shaft kit that has proven its use on large, high-bite tracks. In addition, the

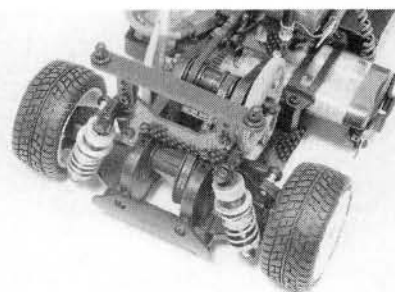
included outdrive bearings are massive, and that means they'll last a very long time.

The Xpress and GTO have a special rising-rate-caster front end that increases the caster angle when the suspension is compressed. On all four corners, you'll find molded lower suspension arms with adjustable upper links. In addition, the Xpress offers several inner and outer camber-link mounting positions that add greatly to the car's "tunability."

Both cars have Roadrunner's unique, half plastic/half aluminum micro-shocks on all four corners (plastic bodies with aluminum caps and shock seals). The shock bodies are threaded and have aluminum spring retainers that allow easy, accurate, spring-rate adjustment. The GTO doesn't come with the aluminum spring retainers, but they're available as options. Overall, the shocks are incredibly light and work well.

The Xpress and GTO both come with a complete set of white-spoke wheels and soft-compound racing radials. The Xpress's rear wheels are of standard width, and it has the new, mid-narrow wheels up front (somewhere between standard and super-narrow). Neither car comes with a body. I don't see this as a strike against them. Most high-end touring-car kits don't include bodies, and I'd prefer to choose my own, thank you very much.

Cliff Murakami from GHI was kind enough to send me two Elite BMW M3 bodies for my review. When I first caught a



The GTO 962K's rear end is similar to its big brother's, but it has standard rear-axle carriers.

Building & Setup Tips

Because I received built-up prototypes of the Xpress and GTO 962K, I can't give you any hardcore building tips; the GTO always comes 80 percent assembled—a good thing because the instruction booklet needs a lot of help. The Xpress's instructions are much better (but not perfect), and they should get you through the building with very few glitches.

I set up both my cars according to information I gathered from ROAR national champion, Tim Bump, and following my own driving experiences.

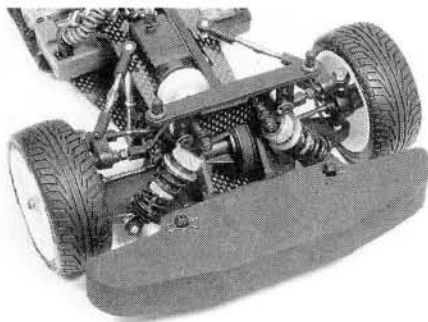
GTO 962K

- Tires: HPI Super Radials on all four corners.
- Shock oil/pistons: 30WT oil; 2-hole pistons on all shocks.
- Springs: Silver springs all around (Tamiya Red tuned springs are a close match).
- Shock length: 59mm on all shocks, measured from top to bottom.
- Spring pre-load: 2mm front, 3mm rear.
- Camber: 2 degrees negative on all wheels.
- Caster: 2 degrees negative.
- Toe-in/out: 1 degree toe-in.
- Special modifying: for some reason, my GTO had a lot of binding in the front suspension. To remedy this, I carved the reinforcing material out of the front "V" ball ends that snap onto the ball joints that are mounted on the top of the front uprights (this modification is mentioned in the supplied setup sheet). This helped a lot, but some binding was still evident after that.

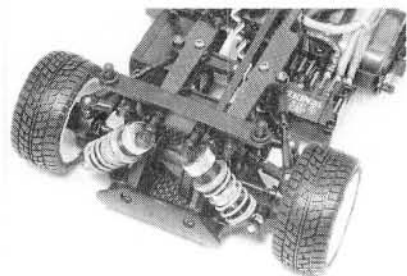
After hours of experimenting, I narrowed the cause of the problem down: it was either extremely tight ball ends, or oversize ball joints. Remember, my car was a prototype. I've talked to other GTO drivers, and none had any of these problems. I ended up replacing all the stock ball joints with Tamiya ball joints. This did the trick; no more binding.

Xpress

- Tires: HPI standard width V-groove radials front and rear, or Roadrunner mid-narrow radials up front and standard width radials in the rear.
- Shock oil/pistons: 50WT oil; 2-hole pistons on all shocks.
- Springs: Black up front and Silver out back.
- Shock length: 54mm front and rear (measured from top to bottom).
- Spring pre-load: 2mm front, 3mm rear.
- Camber: 1 degree negative on all wheels.
- Caster: 3 degrees negative.
- Special modifying: my Xpress was pretty much trouble-free; that is, until I tried to mount my Airtronics 94157 super-high-speed servo. Apparently, the space provided for it on the upper chassis plate forces the servo to be mounted too far forward, and that made the large Kimbrough* servo saver and included center-point steering linkage bind with the right side of the front bulkhead. To allow clearance for the linkage, I had to grind material off the right side of the bulkhead. Again, this problem was exclusive to my prototype; I've been informed that a different upper chassis plate is now included with all Xpress touring cars that leave the factory.



Left: check out the cool foam bumper on the Xpress. Notice how the steering servo is mounted à la F1—direct drive, baby! Check out the rising-rate front end—not only impressive, but functional, too. The car's shocks are extremely light.



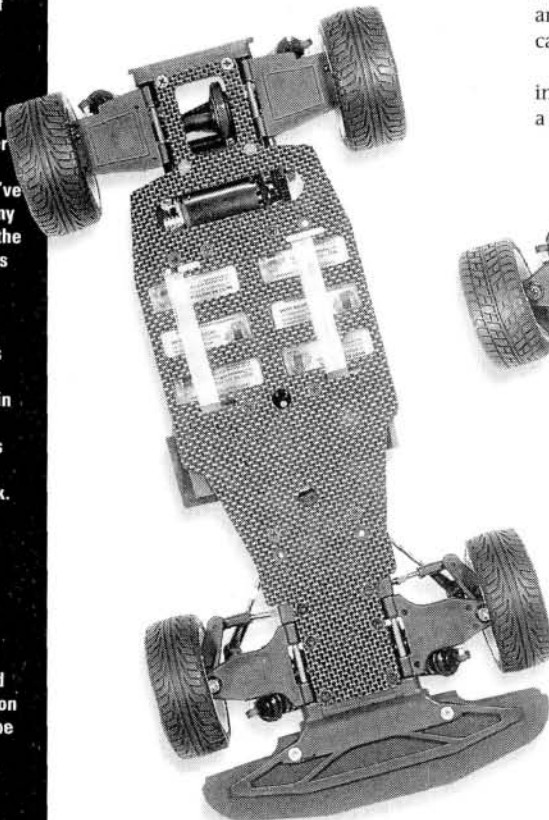
Above: although the GTO 962K uses a more conventional bellcrank steering system and shorter suspension arms, the rest of the car's front end is all Xpress.

glimpse of Elite's new BMW Mini Sedan body, I was jazzed. This thing looks exactly like the 1/10-scale body and offers the same performance benefits. The only difference is that it's smaller—1/12 scale. I wanted to give the cars matching paint jobs that would make them resemble the Valvoline-sponsored BMW racing cars that run in the North American Touring Car Championship (NATCC). Of course I contracted the services of Scott Bich from Bich'n Bodies* to do the airbrushing. Scott used Realistic Racing Colors* paint and Autographics* and Parma* decals to produce the stunning Bimmers you see here.

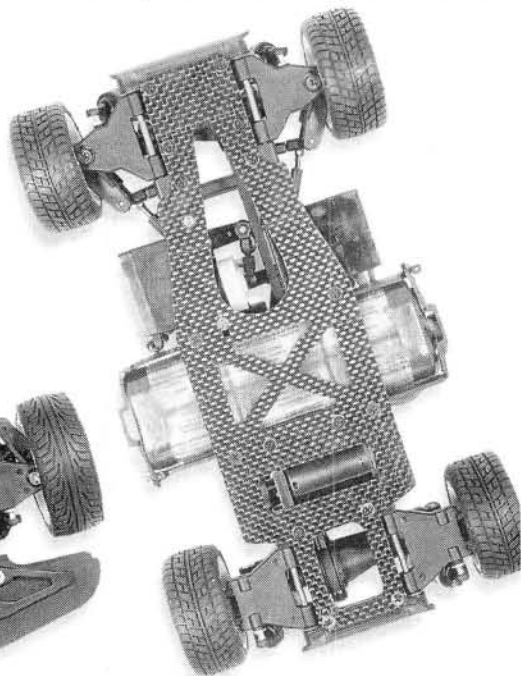
PERFORMANCE

I didn't do any official race testing of these cars—mainly because there aren't too many organized parking-lot races here on the East Coast (a real bummer). The tests were run on a smooth, slick asphalt parking lot. I positioned a few corner markers and ran some high-speed laps to gauge the car's performance.

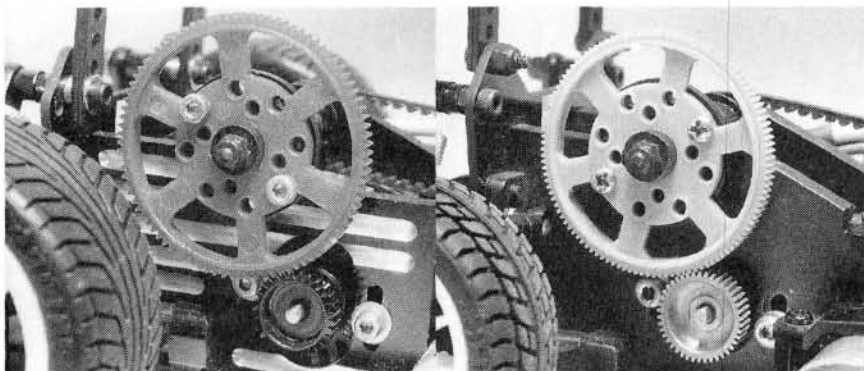
The two cars were prototypes and didn't include wheels and tires. I gave the Xpress a complete set of HPI* low-profile V-Groove



This underbelly shot of the Xpress reveals its slick graphite chassis plate. Notice how the motor actually rests below the chassis line for the lowest possible CG. While you're at it, check out how the saddle-pack battery is mounted as close to the chassis' center line as it can be. These two features are strong contributors to the Xpress's awesome handling characteristics.



Here's a close look at the GTO 962K's low-CG motor mount and graphite chassis plate. When it's time to mount your electronics, things can get a little tight, but there's a space for everything. Like the Xpress, the GTO has a rather large opening near the rear diff, so road debris won't get trapped inside.



The Xpress gets this cool anodized-aluminum heat sink motor mount (left), while the GTO 962K (right) has to make do with a plastic unit. Both cars come with pinion and spur gears. A one-way center shaft is available as an option.

radials (standard fronts and wide rears) and equipped the GTO with a complete set of HPI Mini Super Radials. I also decked out the GTO with a complete set of Mini Star Wheels (white) and the Xpress with a complete set of 5-spoke Super Star wheels (white) so both cars match—somewhat.

I was extremely impressed with the GTO's acceleration and top speed. This little car is absolutely ballistic. The hand-wound Reedy* 12-turn DS motor and expertly matched, Pro-Match* 2000mAh

Likes

- As far as racing features go, both cars are filled to the gills.
- The GTO 962K comes 80 percent assembled.
- Simple straightforward designs.
- Both are excellent performers.
- Low-CG motor mounts.
- Use either stick- or saddle-pack batteries on the Xpress.
- Awesome graphite/aluminum rear axle carriers on the Xpress.
- Cool foam front bumper on the Xpress.
- The Xpress is the lightest touring car available.
- The GTO 962K is in a league of its own (oh, so fast!).

Dislikes

- To get the cars' front suspensions to work without binding, a little hand-finishing was necessary.
- Instructions—especially the GTO's—could use a lot of beefing up.
- It might be difficult to find worthy competition for the GTO 962K.

THINGS YOU'LL NEED

Xpress and GTO 962K

- Two-channel AM or FM radio system.
- Steering servo—preferably high speed.
- 6-cell stick battery pack, or saddle-pack (for the Xpress).
- Battery charger.
- ESC.
- Motor.
- Diff lube.
- Shock oil.
- Lexan body.
- Lexan paint.

SCRC battery pack provided so much power that I had to crank down the current limiter to 75 amps on my Tekin* G-12c ESC. The little car darted into and out of the corners with absolute accuracy and never once lost its composure—even after I ran it repeatedly over a manhole cover at full speed! I'm amazed at how well this little car handles. In fact, it handles as well as any 1/10-scale touring car I've ever driven. I may be going out on a limb here, but in my tests, the GTO was actually faster than the Xpress! The GTO 962K is a fun little car, and I really love that tiny BMW M3 body.

My experience with the Xpress was just as positive. This is one of the most nimble touring cars I have ever driven. It works

FACTORY OPTIONS

GTO 962K

- Aluminum heat-sink motor mount—part no. 968-02.
- Aluminum spring retainers—962-58.
- Tamiya M-chassis body mounts—962-63.
- Pre-built steel diff with ball bearings—968-25.
- Ball-bearing steering kit—962-62.
- One-way shaft set—962-61.
- Six-piece tuned-spring set—968-19.
- Front/rear, trued/mounted foam tires and wheels—962-13.

Xpress

- One-way shaft set—part no. 968-59.
- Six-piece tuned-spring set—968-19.
- Bearing-supported front belt idler set—968-61.
- Front trued/mounted foam tires and wheels—968-15.
- Rear trued/mounted foam tires and wheels—968-16.
- Lightweight universal-joint drive shafts—968-66*.
- Light-aluminum motor mount—968-67*.
- Light-aluminum front bulkhead—968-68*.

* The Xpress is already drastically underweight with respect to ROAR and NORRCA specified weights. These particular parts will make the car lighter, and that means you'll have to add even more weight to make the Xpress ROAR- and NORRCA-legal.

exceptionally well with stick packs, but when it's equipped with a racing-style saddle pack, it's transformed to a whole new level of performance. I can see why this car has such a good track record. I plan to do a lot more racing with it, and I'll let you know how it goes.

My experiences with the Roadrunner Xpress and GTO 962K were very positive; I'll give them the G-Man seal of approval. They definitely rock!

*Addresses are listed alphabetically in the Index of Manufacturers on page 193.

the Competition	Kyosho TF-2	Tamiya TA03	HPI RS4	Yokomo YR-4M	Tenth Technology Predator DTM	Schumacher SST 2000	Roadrunner Xpress
Wheelbase	10.3 in.	10.1 in.	10 in.	10.32 in.	10 in.	10 in.	10.25 in.
Width (F/R)	8 in./8 in.	7.19 in.	8.65 in./9 in.	6.5 in./6.25 in.	7 in./7.25 in.	7.125 in./7.125 in.	7.25 in./7.25 in.
Weight (RTR, w/out body)	47.8 oz.	52 oz.	49 oz.	46.5 oz.	50.6 oz.	50.9 oz.	46 oz.
Diff type	Gear	Ball	Ball	Ball	Ball	Ball	Ball
Chassis	Graphite/alum.	FRP*	Black fiberglass	Graphite	Resin composite	Fiberglass	Graphite
List price	\$259.99	\$356	\$298	\$425	\$479	\$319.50	\$385
Available at*	\$199	\$204.99	\$199.99	\$319.95	\$320	\$190	\$225
Reviewed in	8/95	10/96	5/96	9/96	7/96	12/96	4/97

*Prices may vary **FRP = fiberglass-reinforced plastic



TAMIYA Honda CR-V

by Jeff Bartlett

TAMIYA* HAS spoiled us once again with the realism of its kits; the Honda CR-V is true to the full-size version right down to 4WD drive train, completely independent suspension and flashy Japanese-market Honda graphics. What did we do to deserve this? We clamored over previous replicas born into the 1/10-scale electric arena and begged for more. Striving to bring the 176.4-inch CR-V to market in a cost-effective manner, Honda adapted numerous components and systems found on its current production automobiles for the all-new sport-ute, bringing along a car-like ride and fuel economy in the process. Tamiya followed a similar tight budget-development strategy with its smaller version, choosing the ABS plastic tub chassis used by the Isuzu MU and Mitsubishi Pajero to serve as the foundation for its new, light-duty off-roader. Albeit lengthened slightly for CR-V duties, this narrow-track chassis, borrowed suspension components, tried-and-true mechanical speed control and familiar silver 540-type motor help keep cost to a minimum. Because this new sport-ute promises mind-numbing realism and dirt-proven fun, we decided it would be a good candidate for an appropriate thrashing.

KIT FEATURES

The speed of light, pi and taxes are universal constants. Added to this list is the packaging of a Tamiya kit, whether it be the long-in-the-tooth Clod Buster or the fresh-from-the-mold CR-V.

Exquisitely rendered illustrations adorn each Tamiya box, while, inside, anxious kit builders find concise, illustrated instructions, fasteners grouped by steps and flashless plastic components. The CR-V was no exception.

Speed-reading the near-wordless instructions and diving into the parts bags revealed a Caterpillar-rugged, 4WD system, independent double-A-arm front suspension, live axle/trailing-arm rear suspension, oil-filled, coil-over shocks at each corner, two bevel-gear differentials

(Continued on page 70.)



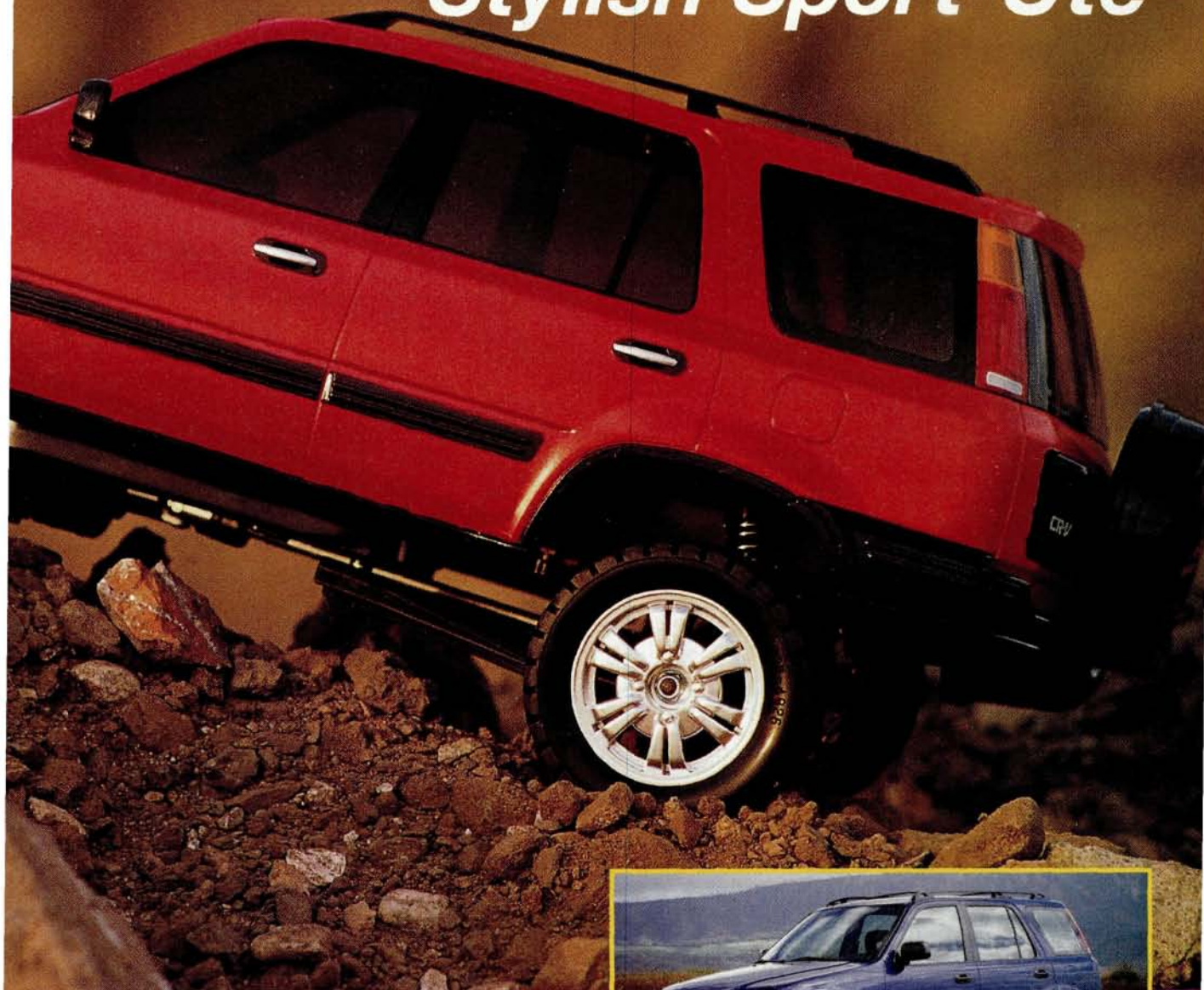
PHOTOS BY JEFF BARTLETT

Specifications

SCALE	1/10
LIST PRICE	\$323
DIMENSIONS	
Overall length	18.7 in.
Wheelbase	9.4 in.
Width (F/R)	5.3 in.
WEIGHT	
Gross (RTR)	3 lbs., 12 oz.
CHASSIS	
Type	Molded tub
Material	ABS plastic
DRIVE TRAIN	
Type	Gear/indirect prop shaft
Primary	Pinion/spur
Transmission	Gear
Differential(s)	Bevel gear
Slipper clutch	None
Bearings/bushings	Plastic bushings

SUSPENSION (F/R)	
Type	Upper and lower A-arm/live axle w/trailing arms
Damping	Oil-filled, coil-over shocks
WHEELS (F/R)	
Type	One-piece chromed plastic
Dimensions (DxW)	2x1 in.
TIRES (F/R)	Rubber street treads
ELECTRICS	
Motor	Mabuchi 540
Battery	Not included
ESC	3-step mechanical wiper w/reverse

Stylish Sport-Ute



CR-V Comfortable Recreation

World-renowned for its well-engineered automobiles, Honda last year introduced the CR-V—its first in-house-designed sport/utility for the Japanese market. (Nitpickers take note: the Passport is a rebadged Isuzu Rodeo.) Standing for Comfortable Runabout Vehicle, the CR-V represents the new breed of “sport/cutes” that were pioneered by the Toyota RAV4 and spawned a legion of future contenders from Ford, Pontiac and other manufacturers. These vehicles combine chassis and powertrain components from existing passenger cars into a civilized SUV package that has a rugged appearance, 4WD traction, nimble handling and satisfactory fuel economy. As a bonus, because existing parts shelves had been raided to assemble these fun-loving hybrids, the relatively low development cost has been passed along to the consumer.

Toyota was clearly on to something with its mini-ute, but, upon introduction, the CR-V tripled RAV4 sales in Japan, spelling a phenomenal success for Honda's first SUV product. Honda's home run uses a 2.0-liter, 126hp, 4-cylinder engine derived from the Integra powerplant,



The “real” CR-V. Hard to tell it from the Tamiya kit!

along with a Civic-based suspension and an all-wheel-drive system adapted from a Japan-only Odyssey model. These hard parts are fitted to a space-efficient sport-ute body replete with thoughtful touches and unique features. Standard equipment on the U.S.-bound model includes automatic transmission, air conditioning, a Micron air filtration system, power windows/door locks/mirrors, cruise control, AM/FM stereo and a lift-out, folding picnic table. With prices beginning at well under \$20,000, the CR-V represents a potent value in this burgeoning segment.

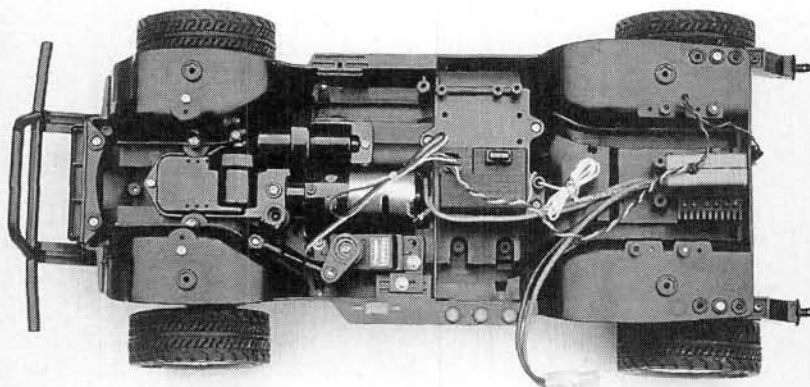
Studying Tamiya's 1/10-scale rendition, it appears to be the Japanese LX model, which is similar to the sole U.S. version and is denoted by the dark gray bumpers and optional split-spoke wheels. The roof rack, hard spare-tire cover and flashy graphics (which I chose not to apply) are all available overseas, and it hasn't been determined which items will be offered stateside.

TAMIYA HONDA CR-V

(Continued from page 68.)

and a stunningly reproduced body. Before opening any plastic-wrapped components, I gathered up my basic R/C tools, including two Phillips screwdrivers (nos. 1 and 2), nail clippers (for removing parts from their trees), cereal bowls (for holding small parts and fasteners), thread-lock, a file and toothpicks. I spread it all out on a large work surface and taped the bag labels to the bowls as each cellophane pouch was opened.

Building a 4WD vehicle can seem intimidating at first, with a pile of small, complicated parts making up the drive system. However, because of the precisely engineered tolerances, the CR-V couldn't have been easier to assemble. Each piece fell right into place, so long as the concise instructions were followed to the letter. The metal drive shaft and differential housings certainly contribute to the CR-V's weight, but the heavy-duty pieces should withstand mean-spirited, throttle-jockey use and a bit of abuse. Beyond controlling axle movement, malleable trailing arms connected at



The Tamiya Honda CR-V uses the same chassis as the Tamiya Jeep Wrangler, Mitsubishi Pajero and Isuzu Mu. The only difference is that it's a tad longer. Check out the wheel wells—awesome! One of the best features of this chassis are all the mounting choices for installing the radio gear.

the rear essentially act as a damping mechanism, absorbing some road feedback while keeping the tires firmly planted. There isn't any suspension slop, but it will be interesting to see how this configuration wears over time.

TEST GEAR

As a longtime Futaba* radio user, I glommed on to the new entry-level 2PC-AM pistol-grip radios when they came on the scene. The simple design incorporates the essential steering and throttle-trim controls and servo-reversing switches without the wallet-sapping bells and whistles. With the wide-base housing and the eight AA batteries required to power the 2PC-AM, the radio is very stable when left standing—an improvement on the previous "gun clip" designs used on earlier Futaba radios. The basic system included an R122JE receiver and a pair of S3003 servos. While Tamiya thoughtfully included a mechanical three-step speed control, I wanted smooth, linear acceleration throughout the power band along with the braking available with an electronic speed control. Pilfering a Novak* 610-RV with reverse from another car, I was able to plug the orange Novak unit into the Futaba receiver by using the appropriate input plug included with the ESC. Powering the CR-V is a set of 6-cell DuraTrax* 1700mAh SCR battery packs with Tamiya connectors.

IN THE PAINT SHOP

Transforming the stark white body shell into a stunning rendering of the full-scale Honda CR-V is quite straightforward, though it requires a surgeon-steady hand for some detail trim. By following these basic steps and exercising a measure of patience, even a novice can produce praise-worthy results.

Selecting paint from the initially limited color choices of the U.S.-spec CR-V yields a choice of black, deep royal blue, burgundy and silver making the list. Looking to Japan's offerings adds an electric blue and forest green to the palette. These colors can be enlivened with the included decals, but I wanted my CR-V to approximate the vehicles I'd see roaming local streets. To make it look lively without pushing the boundaries of bad taste, I picked up two cans of Testor*

Building & Setup Tips

- With more than a dozen plastic bearings, drive-train drag will affect performance and energy efficiency. If you decide to use sealed bearings to solve this problem, you'll save a lot of time if you install them during assembly. If you wait, a retrofit means disassembling much of the vehicle.
- Use thread-locking compound only on metal-to-metal contacts. It isn't needed to fasten plastics, and it also may eat away at the plastic.
- Step 1. Be sure to align the motor holes with those on the included 16-tooth pinion gear.
- Step 2. Use the brass-colored MA14 tapping screws, not the similarly sized silver MA13 screws, to secure the front differential cover. The proper screws will set flush into the cover.
- Step 4. Motor terminals will have to be bent slightly to fit the silver can into the chassis.
- Step 11. A clean work surface ensures that debris won't find its way into the diff during assembly. Tighten screws incrementally for an even seating of the diff covers.
- Step 16. The instructions warn you to be careful while screwing the plastic ball sockets onto the damper shaft so as not to damage the shaft with pliers; a scratched shaft will hinder the shock's performance. To protect the shaft, fold a tissue in half, and wrap it around the pliers' mouth. A couple of drops of shock oil on the rubber O-rings at the base of the damper cylinder permit the shaft to pass through with a slight clockwise rotation.

THINGS YOU'LL NEED

- 2-channel radio system with two servos, or one servo and an electronic speed control.
- 6-cell battery pack.
- Battery charger.
- Paint for polycarbonate body.
- Fine paintbrush.
- Phillips nos. 1 and 2 screwdrivers, thread-lock compound, parts trimmer.

The Competition	Tamiya Mitsubishi Pajero	Tamiya Isuzu Amigo	Tamiya Honda CR-V	Tamiya M1025 Hummer
Wheelbase	9.75 in.	9.75 in.	10.1 in.	11.2 in.
Width	7 5/8 in.	7.5 in.	5.3 in.	8.1 in.
Weight	3 lbs., 7 oz.	3 lb., 12 oz.	3 lb., 12 oz.	3 lb., 1.6 oz.
Diff type	Gear	Bevel gear	Bevel gear	Gear/adjustable ball
Chassis	Molded tub	Molded tub	Molded tub	Molded plastic tub
List price	\$272	\$279	\$323.00	\$232
Available at*	\$169.99*	\$179.99*	\$219.99*	\$174.99*
Reviewed in	12/94	11/95	4/97	9/96

*Prices vary with location.



The flip side reveals the CR-V's straight rear axle and trailing-arm rear suspension. Check out the beefy universal joints on the drive shaft. If you look closely, you'll notice the truck's transfer case, which splits the power between the front and rear wheels.

FACTORY OPTIONS

- Light-bulb set—part no. 50320.
- RS540 sport-tuned motor—53068.
- Cross-country 4WD low-ride conversion kit—53187.
- Cross-country 4WD torque-splitter unit—53188.
- Sealed ball-bearing sets—53008, 53126, 53029, 53030, 53065, 53126.

Guards Red spray enamel. While the instructions suggested Tamiya German Gray for the bumpers, I went with Tamiya Semi-Gloss Black (part no. X-18) to match the trim, including black plastic mirrors, roof rack and brush guard.

First, remove the molding tree from the sunroof, and sand the edges smooth. The body must be cleaned with a mild detergent to remove dirt and oils, then dried with a lint-free towel before cracking open any paint. In a well-ventilated area, I applied several light coats of red on the unmasked body, making sure to begin the paint stream ahead of the body and continuing in a fluid motion past the body to provide even coverage. Allowing it to dry between each coat created a strong color foundation without using primer or unnecessarily sanding the body, which would sacrifice the edges of subtle details. Setting aside the half-spent can, I used the fresh can to spray several heavy coats, being careful to avoid running. The thick application produces a self-leveling effect that reduces the lunar-surface texture that often plagues spray-can paint jobs.

After a couple days of drying, the blood-red body was ready for the black. Using a pair of artist's brushes, I applied three coats of black to the wide bumpers and used a fine brush to do the intensive edge work. Carefully following the door frames and delicately dancing around the grill emblem, I was able to give a fair measure of realism to the paint job. The final touches consisted of silver door handles and turn-

signal amber side markers. The black trim pieces simply screw onto the sparkling body, along with the tinted, one-piece windows. The side mirrors feature a rubber O-ring—a thoughtful touch that allows them to absorb minor impacts without breaking. A full decal sheet allows plenty of identifying logos and colorful pizzazz, but I kept things simple for aesthetic reasons. Once completed, the excruciating detail demands that the body be hermetically sealed in a museum display. Hmmm ... I may have to paint up a simple thrasher body.

PERFORMANCE

Driving all four wheels, the CR-V's handling was surprisingly tenacious from the first squeeze of the pistol-grip trigger. Despite how much the CR-V wants to hold onto asphalt through whatever impossible maneuvers it is guided, the high center of

Likes

- Ultra-realism.
- Ease of assembly.
- Heavy-metal driveline.
- Available before the full-size CR-V in the States.

Dislikes

- Low ground clearance.
- High CG.
- Abundance of plastic bushings.

gravity and fashion-oriented tires proved to be weak links. Care must be exercised on uneven surfaces so the sport-ute doesn't tip onto its lovingly prepared lid. The stress of riding the limits of adhesion, where the CR-V is delicately balanced at the edge of its abilities without perilously going beyond has me thinking seriously about a lighter Lexan body whose sole existence would be to sacrifice itself to protect the polystyrene body preserved for display purposes.

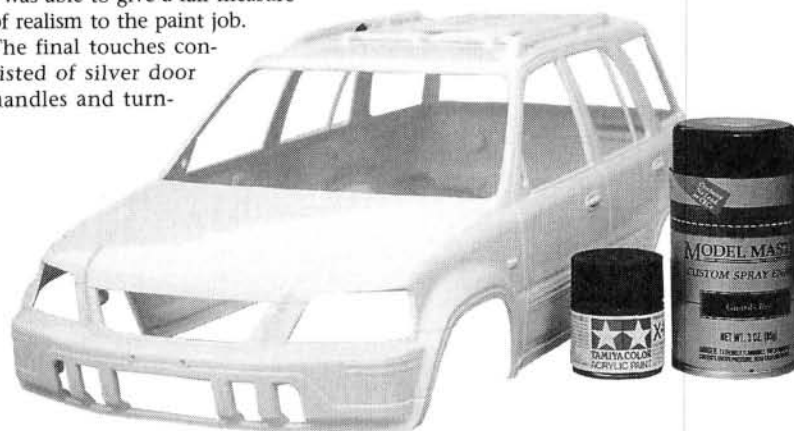
Like its full-size inspiration, the 1/10-scale CR-V proved to be well-suited to light, off-road duties, capably climbing loose dirt inclines and predictably oversteering through sweeping turns. This hybrid vehicle can fulfill thrill-seeking desires both on and off pavement without truly excelling at either, the way a purpose-built vehicle can.

Modest acceleration and run times exposed the need for full bearings throughout to reduce rolling friction. Tamiya, as well as several aftermarket companies, offers sealed bearings for this application, and they are highly recommended. Dirt-bound drivers will want wider wheels with more aggressive tires to enhance traction and improve lateral stability. The low 7/8 inch of ground clearance could be improved with larger-diameter tires, but the tight wheel wells would necessitate a tricky body lift to accommodate the over-size rubber. Power mongers will want to take full advantage of the heavy-metal driveline by adding a hotter motor, which would be desirable to offset the increased rolling resistance from wider tires.

FINAL THOUGHTS

With an increased emphasis on race vehicles, it is comforting that Tamiya continues to produce recreational cars and trucks. While the CR-V could compete in its own hybrid class, the strength of the plastic sport-ute is in its ability to satisfy the needs of the average enthusiast looking for stress-free, non-competitive recreation without sacrificing sophistication. The kit leaves room to grow, with several upgrades, including a more potent motor, headlight kit and low-ride suspension kit that are readily available. While this derivative kit won't set the R/C world on fire, it offers a special spark for fun-seeking enthusiasts.

*Addresses are listed alphabetically in the Index of Manufacturers on page 193.



Here's what the ABS plastic body shell looks like before painting. Use paints that are designed for static models—not Lexan. Testor Model Master spray paint was first applied in thin layers over the non-primed body, then in several thicker coats to create a self-leveling effect. Once dry, Tamiya Semi-Gloss Black was used for most of the detail work.

BOLINK All Star Legend

by Rick Eyrich

UNLESS YOU'VE been hiding out in a hole for the past several years, you know how popular the Bolink* Legend cars have become. These basic, easy-to-build, parking-lot racers are everywhere on the planet, and Bolink has now added another Legends vehicle: Outlaw sprint cars!

These open-wheel cars run on both dirt and asphalt ovals throughout the U.S. and Australia, and if you aren't already a fan, you will be if you see them compete! The 1/10-scale Bolink All

Star Sprinter has many of the same components as its Legend cousins—plus, it's just as much fun to drive!

Because Bolink packages the All Star with the typical parts bags, you should have the basic chassis completed in two or three hours.

The twin chassis plates, battery/radio tray and front axle are fiberglass, while the side nerf bars are Kydex. The kit comes with an adjustable ball diff, a steel axle and 48-pitch spur/pinion gears, Oilite bushings for the front/rear wheels and

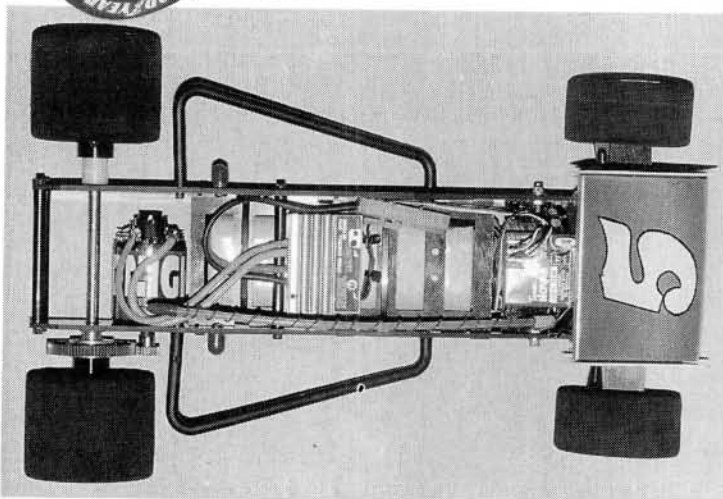
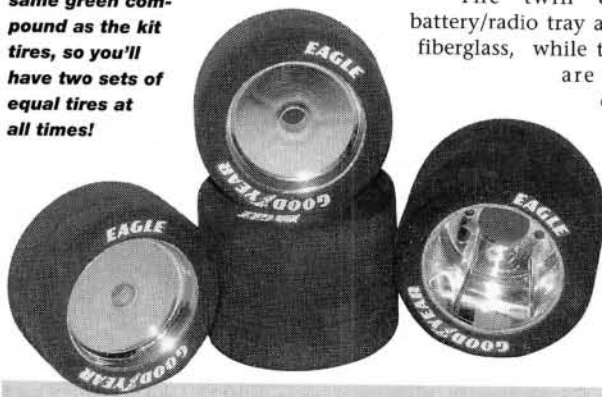
green-dot-compound tires. To wrap up the package, Bolink gives you a clear sprinter body shell, engine headers, a driver figure and two Lexan wings.

As is my nature, I *had* to make a couple of changes to give the All Star that personal touch! I replaced the front and rear axle bushings with

THE LEGEND

GETS

The optional Legend chrome wheels were added for one simple reason: they look great on the car! And the foams are the same green compound as the kit tires, so you'll have two sets of equal tires at all times!



To achieve a true-to-scale look, Bolink gave the open-wheel car these side nerf bars. They're made out of tough Kydex-style plastic and should keep the rear wheels safe in most accidents—crashes and rollovers.

Bolink's optional full ball-bearing set, and I also installed the company's chrome wheels.

My other modification was to replace the kit's wire-rod steering linkages with a pair of Lunsford* turnbuckles and some Du-Bro* rod ends. This reduces free play in the steering and the chances of a wire rod slipping in a crash.

TEST GEAR

- Six-cell Sanyo* SCRC1700 battery pack.
- Trinity* Midnight stock motor.
- Tekin* Rebel ESC.
- Novak 2-channel AM receiver (75 band).
- Futaba* S132H high-speed servo.
- Futaba Magnum T2PD AM transmitter.

PERFORMANCE

I tested the All Star on two surfaces: a concrete parking lot and a banked, R/C car, asphalt oval. The concrete required the addition of Paragon* Ground Effects traction compound (but only to the

(Continued on page 83)

THINGS YOU'LL NEED

- 2-channel radio system.
- ESC.
- Motor.
- 4- to 6-cell stick-type battery pack.
- Battery charger.
- Lexan paint for body.
- Servo-saver (steering).



OUTLAWED

The kit's Lexan driver figure comes in two parts: the main torso and the helmet/head. When the pieces had been painted and the helmet had been attached with Shoe Goo, the driver was fixed to the inner body shell with a homemade Lexan mount and servo tape.



It's all in the details



The folks at Bolink went out of their way to include a highly detailed polycarbonate (Lexan) body shell with the All Star Sprinter. It has the roll cage, steering arm, rear nerf bar and radius-rod locations molded into it. A driver figure, a header set and two wings complete its appearance.

Like its full-size counterparts, the All Star's wings may be adjusted to alter downforce, so they're a big part of car setup. I strongly recommend that you take the time to mask and paint this car properly to ensure its good looks!

specifications

SCALE 1/10
LIST PRICE \$109.95

DIMENSIONS

Length overall 16 in.
Wheelbase 10.1 in.
Width (F/R) 8.25 in.

WEIGHT (gross/RTR) 2 lb., 2 oz.

CHASSIS

Type Twin-plate vertical ladder
Material Fiberglass

DRIVE TRAIN

Type Gear/direct drive
Primary Pinion/spur
Transmission Solid axle
Differential(s) Ball
Slipper clutch None
Bearings/bushings Metal bushings

SUSPENSION (F/R)

Type Kingpin coil-spring/none
Damping None

WHEELS

Type (F/R) 1-piece plastic spoke
Dimensions (DxW)
—Front 2.4x1.25 in.
—Rear 2.5x2 in.

TIRES (F/R) Green-compound foams

ELECTRICS

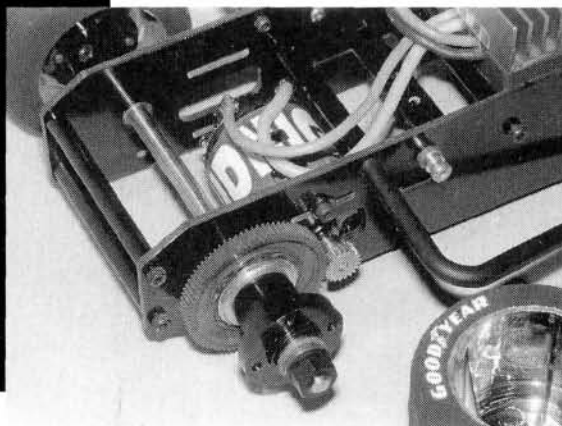
Motor, battery, ESC Not included



Building & Setup Tips

- Because of their tight fit on the chassis plates, you should take extra care when installing the rear axle bushings. Avoid using pliers or hammers on them, and **PRESS** them into place with a small vise.
- Check everything thoroughly before you do the final assembly of the twin frame plates. It's possible to reverse some pieces if you aren't careful!
- Use some crocus cloth or 1,000-grit sandpaper to polish the front axle kingpins. Trinity's heavy Purple Stuff silicone lube was used on the polished units to damp their action.
- Take plenty of time to mask off, paint, mount and detail the body and wings. It can really make a difference to the finished vehicle's looks.
- To ensure the car tracks properly, after any major impact with another car or a wall, always check for chassis "tweak" At the same time, check the rear axle for drag, too.
- The All Star's wings are adjustable, so you can easily alter the car's traction/grip; but don't overlook the weight bias movement of the Ni-Cd battery pack fore/aft on the chassis; it may be used to alter front and rear traction.

The All Star's rear axle diff unit was simple to build, it runs smoothly and is easy to maintain. The steel rear axle was also given bearings on both chassis plates.



Servo tape and nylon screws keep both of the wings firmly attached to the molded/shaped Lexan mounts. You can alter downforce on both ends of the chassis because both wings are adjustable.

inside edges of all four tires), but on the asphalt, the Bolink stuck to the tarmac without needing compound.

The SCRC1700/Midnight motor combo moved the car along nicely, and it was a blast to drive! It stayed stable, especially once the twin wings had been properly adjusted.

I found the best wing settings were to have the big top wing as far forward as possible and also to put the maximum downward angle on the small front wing. This setup worked on both test tracks, as did the stock front axle springs. Your car's battery-pack placement can also alter the setup, but only slightly, in comparison with the effects of wing placement.

My only other adjustment during the test program was to the rear-axle diff unit. I prefer a tight diff setting, but I found the All Star handled better when set up slightly looser. Beyond that, I just enjoyed running it.

FACTORY OPTIONS

- Front/rear ball-bearing set—part no. BL5451.
- Aluminum diff hub—BL3518.
- Chrome Legend wheel set (green-compound tires)—BL3203.
- Machined Delrin diff hub—BL3518-L.
- Spring assortment—BL5143.
- Graphite axle—BL5754.

FINAL THOUGHTS

I've tinkered with—and been impressed by—a couple of the Legend Series R/C vehicles in the past, and I was again quite impressed with my experience with the new All Star sprinter. The Bolink folks have really mastered the design of a basic, fun-to-drive R/C car that, at the same time, is also easy to assemble, maintain and enjoy!

Plus, due to the car's unique interchangeability, with a few bits and pieces from the All Star parts list, you can easily convert your sedan Legend into an open-wheel car! So why not add the All Star Sprinter to your R/C car collection? Who knows? In time, you might find yourself wearing a T-shirt that reads, "Real R/C race cars don't have fenders!"



Likes

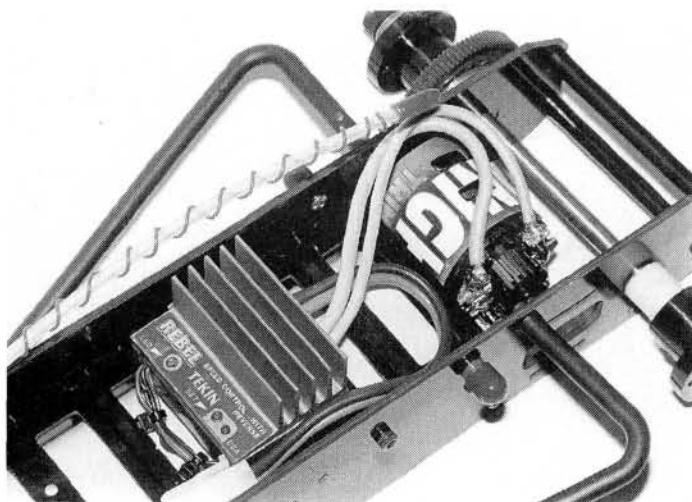
- Simple, tough, overall construction.
- Ample room on chassis for radio gear.
- Low parts count (like other Legend cars).



Dislikes

- No rear suspension.
- If the front axle is damaged, a complete tear-down is required to replace it.
- Paintwork required on some parts of the body is definitely NOT for beginners!

*Addresses are listed alphabetically in the Index of Manufacturers on page 193.



The Tekin Rebel ESC and Trinity Midnight motor combo give the All Star great throttle control and high speeds. Because of the Midnight's high torque, I ran the diff slightly loose to decrease the car's hooking on takeoff!

1997 RACE SCHEDULE

Looking for somewhere to race this year? Well, if it's being raced during the 1997 season, here's where you'll find it! The following are the schedules of all the upcoming regional and national events for ROAR, NORRCA and the IEDA. So get your gear ready and join the racing action!



DATE	EVENT	HOST TRACK
March 21-23	1/12-scale On-Road Nats	Dalton Raceway & Hobby Dalton, GA (706) 226-6699
May 16-18	Dirt Oval Nats	Hot Rod Hobbies Saugus, CA (805) 255-2404
June 13-15	1/12- & 1/10-scale Electric On-Road Nats	Southwest Florida R/C Raceway Naples, FL (813) 353-6556
June 27-29	1/10-scale Modified Off-Road Nats (2WD-4WD-Truck)	Eastex Raceway (K&M Racing) Spring, TX (713) 399-9777
July 11-13	1/8- & 1/10-scale Off-Road Gas Nats	JR's Race Place Waldorf, MD (410) 947-2766
July 25-27	1/10-scale Stock Nats (2WD-4WD-Truck)	Tacoma R/C Tacoma, WA (206) 565-1935
August 29-31	Gas On-Road Nats	Tri-State R/C Cincinnati, OH (513) 984-5410
September 19-21	Paved Oval Nats	King Superspeedway King, NC (910) 983-3969
October 17-19	Carpet Oval Nats	K/N R/C Speedway Stafford Springs, CT (860) 684-9896
TBA	Canadian 1/10-scale Off-Road Champs	TBA
TBA	Canadian 1/12-scale 4-cell Champs	TBA



DATE	EVENT	HOST TRACK
March 8-9	8th Annual G.E.A.R. Off-Road Club Challenge	Racers Haven Bakersfield, CA
March 14	Dirt Oval #2 So. Cal. (Friday night)	Racers Haven Bakersfield, CA (Continued on page 136)

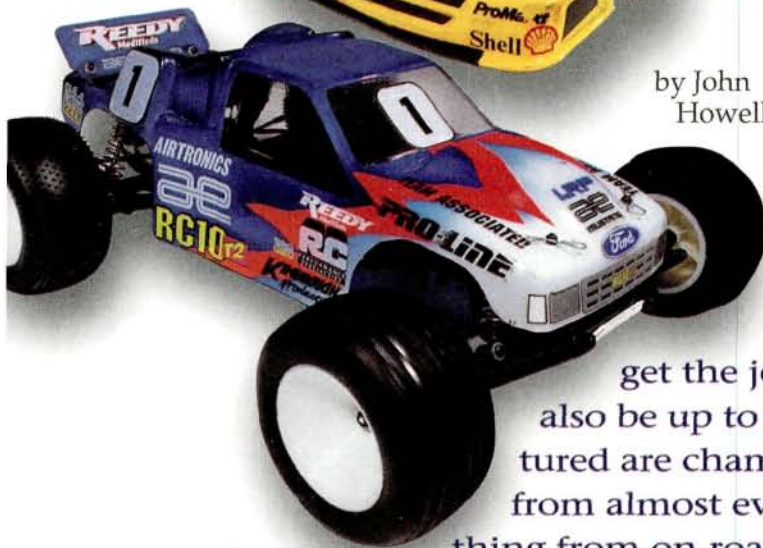
*Dirt, carpet & asphalt:
how the pros get dialed in*



PHOTOS BY WALTER SIDAS



by John
Howell



4 Championship-Winning Setups

To win a major race, you not only need the driving skills to get the job done, but your car must also be up to the task. The four cars featured are championship-winning rides from almost every type of racing—everything from on-road carpet, to off-road electric and gas, to touring-car racing. What's interesting is that not one of the featured cars is equipped with any items that can't be bought by you and me. Check out what these four racers used to get to the checkered flag ahead of the rest of the pack.

David Jun's Tamiya TA03



David Jun

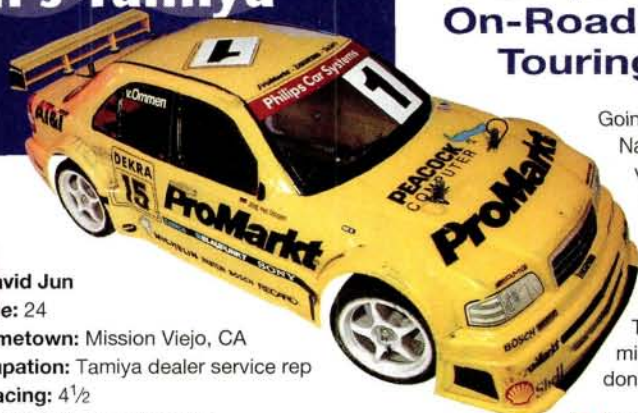
Age: 24

Hometown: Mission Viejo, CA

Occupation: Tamiya dealer service rep

Years racing: 4½

Hobbies: flying R/C helicopters, snowboarding



Championship: NORRCA On-Road Nationals—Touring Car class

Going into the main event at the NORRCA On-Road Nationals, Tamiya's* David Jun was facing some very stiff competition in the form of multi-on-road-champion drivers Barry Baker and Chris Tossolini. So what did David do? He stayed calm and collected and then focused and went out to win two of the three A-Mains, giving Tamiya their first ever U.S. National Touring Car championship. While David's name might not be a household word in the R/C world, don't expect this to be the last time you hear it

■ Front End

- Shocks—stock plastic units
- Associated* 80WT silicone oil
- Single-hole pistons
- Optional Tamiya Yellow Speed-Tuned springs
- 1-degree toe-out
- Stock upper links (2 degrees of negative camber)
- Futaba* 9402 steering servo
- Kawada* belted slicks (Orange compound)
- 4.5mm ride height (chassis is level)

■ Rear End

- Shocks—stock plastic units
- Associated 80WT silicone oil
- Single-hole pistons
- Blue springs
- Kawada belted slicks (Orange compound)
- 4.5mm ride height (chassis is level)

■ Power

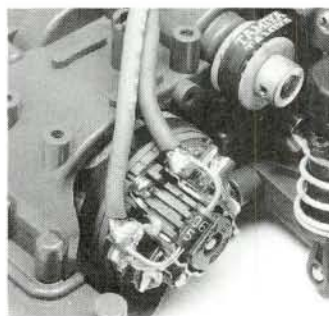
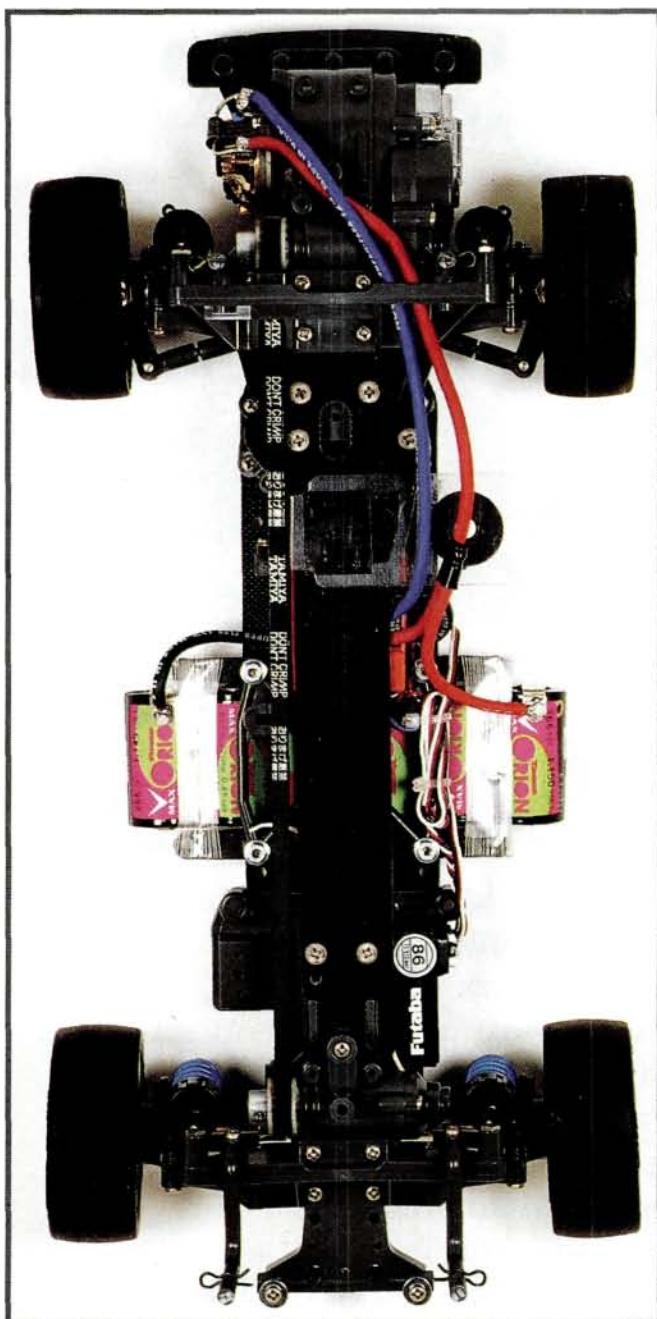
- Motor: Peak Performance* EBX 11-turn double
- Battery: Orion* V-Max 1700 27A (hard-wired into place)

■ Electronics

- ESC: Novak* Tempest
- Receiver: Futaba PCM

■ Other Details

- 16-tooth stock pulleys—no belt tensioner used
- Gearing: 63-tooth spur, 22-tooth pinion
- Wheels: Tamiya 5-spoke
- Body: Tamiya Mercedes ProMarkt
- Battery mounting—forward for more steering
- No swaybars
- Tamiya heat-sink motor plate (external aluminum cover helps dissipate heat more effectively)
- Stock steel drive shafts



Above: you'll find Kawada belted slicks (Orange compound) at each corner. **Left:** powering David Jun's Tamiya TA03 is a Peak Performance EBX 11-turn double. The stock 16-tooth pulleys were retained.

Richard Saxton's Team Associated RC10GT

Championship: NORRCA Truck World Cup—Gas class

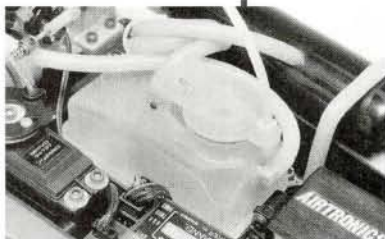
Richard Saxton's first big win was the NORRCA Truck World Cup Gas title—and what an accomplishment it is. After TQ'ing the class, Richard had to endure 45 minutes of nerve-wracking competition, and he repeatedly had to fend off his teammate and last year's champion, Mark Pavidis, before going on to win.

■ Front End

- Shocks
 - Associated 35WT silicone oil
 - Number-2 pistons
 - No travel limiters
 - Associated Silver springs
- Shock-tower mounting position: outside hole
- Suspension-arm mounting position: outside hole
- 30-degree caster blocks
- 0-degree toe
- 0-degree camber
- Airtronics 94158 servo (for additional strength, Richard used two back-to-back servo arms)
- Team Losi Losi Silver directional tires
- Ride height: arms slightly above level

■ Rear End

- Shocks
 - Associated 30WT silicone oil
 - Number-1 pistons
 - Green springs
 - No travel limiters
- Shock-tower mounting position: outside hole
- Suspension arm mounting position: outside hole
- Rear hub spacers to the rear of the hub
- 2 degrees negative camber
- 3-degree suspension mount
- 1.5-degree rear carriers
- Camber-link position: bottom, inside hole on bulkhead
- Team Losi Silver IFMAR Pin tires
- Ride height: drive shafts level
- MIP* Polished CVDs



For easier access to the fuel tank, Richard mounted it backwards so his pitman could easily get to the tie-strap and lift the tank lid.

■ Electronics

- Throttle servo: Airtronics 94737
- Receiver: Airtronics 92237 27 FM

■ Engine

- Engine: O.S.* CZ-Z (ported by Curtis Husting)
- Fuel: O'Donnell*
- Pipe: standard Associated black-anodized
- Gearing: 66-tooth spur, 15-tooth pinion



Name: Richard Saxton

Age: 24

Occupation: property manager

Hometown: Las Vegas, NV

Years racing: 4

Hobbies: racing dirt bikes



■ Other Details

- Painted by Abe's
- Pitman: Regan LeBlanc

Joel Johnson's Trinity 22.2j

Championship:
**1/12-scale Cleveland
Indoor Champs**



AName: Joel Johnson
Age: 29
Hometown: San Jose, CA
Occupation: Student
Years racing: 22
Hobbies: roller hockey, computers, mountain biking



Trinity* racer Joel Johnson has been racing R/C cars regularly for almost as long as most of the other pro R/C racers have been alive! Arguably one of the best, if not *the* best racer in the world, Joel recently used the newest version of Trinity's venerable 1/12-scale 22.2j to win his seventh Cleveland Indoor Champ title.

■ Front End

- 0.022 front springs
- 2 degrees of caster at ride height (changes to 0 degrees as suspension is compressed)
- Upper arm canted 10 degrees forward to provide reactive caster
- 3 degrees negative camber
- Airtronics* 94145 steering servo (mounted directly on the chassis to produce more steering Ackerman)
- Jaco wheels and foams—Purple-compound 175s

■ Rear End

- .074-inch-thick Trinity T-bar
- Damper tube filled with Team Losi* light Hydra Drive Fluid
- Trinity graphite axle (maximum width, 6³/₄ inches)
- Center shock filled with Trinity 30WT silicone oil
- Jaco* wheels and foams—Gray compound 185s

■ Power

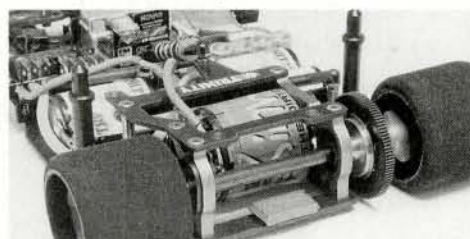
- Motor: Trinity Dirtinator 15-turn double
- Battery: Trinity 30A VIS EX-TRA cells (four)

■ Electronics

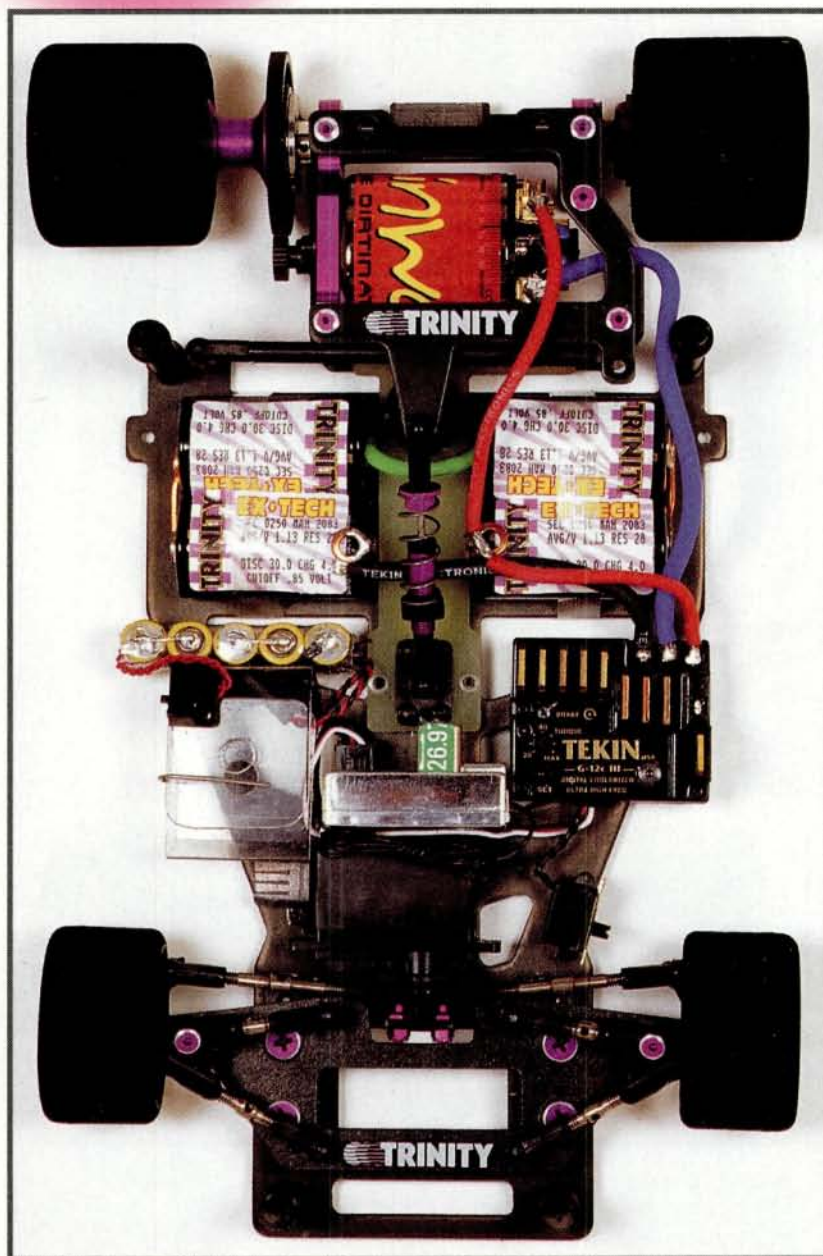
- ESC: Tekin* G-12cIII
- Receiver: Novak Mercury FM
- Five 50mAh cells power the radio system

■ Other Details

- Gearing: 105-tooth spur, 27-tooth pinion
- Body: Protoform* Nissan P35
- Joel received parts for Trinity's new front end too late to use in the Cleveland race, so he used his previous year's setup. Without having time to test the new front end, he settled on a setup he was already familiar with.



Powering Joel's 22.2j is a Trinity Dirtinator 15-turn double. Also in the rear of the car you'll find a Trinity graphite axle and Jaco foams (Gray compound).



Mark Pavidis' Team Associated RC10T2

Championship: NORRCA Truck World Cup—Electric class



Name: Mark Pavidis
Age: 24
Hometown: Fountain Valley, CA
Occupation: R&D at Associated
Years racing: 11½
Hobbies: racing dirt bikes

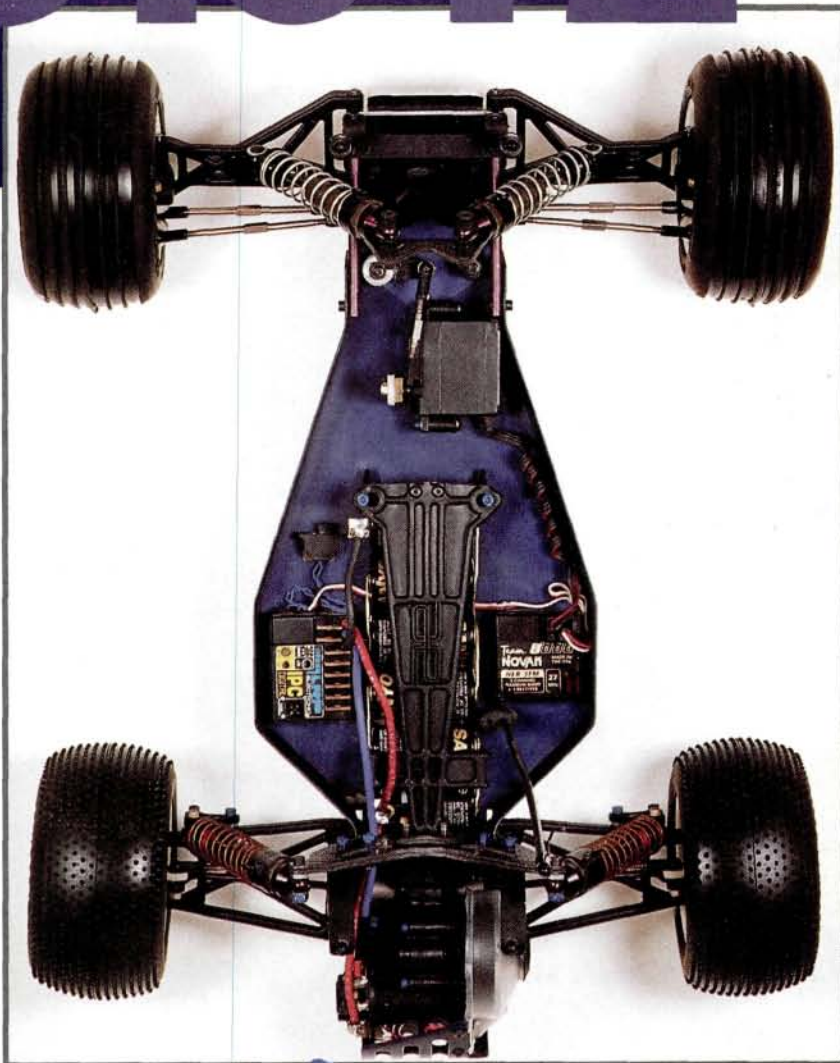
Mark Pavidis is Team Associated's number-one gun. Going into the NORRCA Truck World Cup, Mark was the defending champion in both the Electric and the Gas classes. This time around, Mark retained his Electric title while his teammate Richard Saxton went on to claim the Gas title.

■ Front End

- Shocks
 - Associated 30WT silicone oil
 - Number-2 pistons
 - One thin limiter—0.031 inch thick—inside the shock
 - Associated Silver springs
- Shock-tower mounting position: outside hole
- Suspension-arm mounting position: outside hole
- 30-degree caster blocks
- 0-degree toe
- 2 degrees negative camber
- Airtronics 94155 steering servo
- Team Losi Silver directional tires
- Ride height: arms level

■ Rear End

- Shocks
 - Associated 30WT silicone oil
 - Number-1 pistons
 - No travel limiters
 - Yokomo® Copper springs
 - Two O-rings on outside of shock shaft limit up-travel
- Shock-tower mounting position: outside hole
- Suspension-arm mounting position: outside hole
- Rear hub carriers, middle position; one spacer on each side
- 2 degrees negative camber
- 3-degree suspension mount
- 0-degree hubs
- Camber-link position: inside hole on bulkhead
- Team Losi Silver IFMAR Pin tires



- Ride height: universals level
- MIP CVDs

■ Power

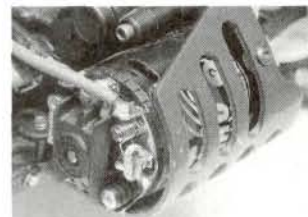
- Motor: Reedy® Sonic II ? (10-turn double)
- Batteries: six Reedy Zappers 1700 27A cells hard-wired and positioned toward the back of the truck

■ Electronics

- ESC: LRP ICS Digital
- Receiver: Novak NER-3FM

■ Other Details

- Gearing: 87-tooth spur, 18-tooth pinion
- Mark installed his rear shocks on the rear of the shock tower, and the tower itself was installed on the front of the bulkhead instead of being on the back of it. This brought the shocks closer to the center of the arm for less suspension-arm flexing.
- Standard aluminum T2 chassis anodized blue.



A Reedy Sonic II ? 10-turn double powered Mark's T2.

Wire Neatly

Professional Routing Tricks

DOES NEATNESS ever not count? I can't think of one instance when being neat doesn't matter at all. Even when a demolition crew blows up a building, it's nice 'n' neat: the building just crumbles into itself. And y'know what? Neatness counts in R/C, too.

I get all edgy if my pit box and workbench aren't tidy, but what I really can't stand is sloppy wiring. It's not just an aesthetic thing, either. There are real benefits to keeping all the connections in your car laid out neat 'n' clean, instead of driving a car that looks like a rolling bowl of Ramen noodles. First, you'll be able to diagnose problems and work on your car more easily. A tidy wiring job will allow you to see each connection from receiver to servo to battery to ESC. That way, when your car acts up, you can easily determine whether you have a popped battery bar, unplugged ESC, hung brush, or other problem.

Neatness can also prevent your car from acting up in the first place. I've seen antenna wires ripped out by spur gears, servo leads dragged under the chassis until they were worn through and smoking, molten battery packs due to wires that had rubbed through their insulation and shorted. Properly routed wiring would have prevented all these mishaps.

HOW WOULD SPOCK DO IT?

Logic dictates that the battery be close to the speed control, which should in

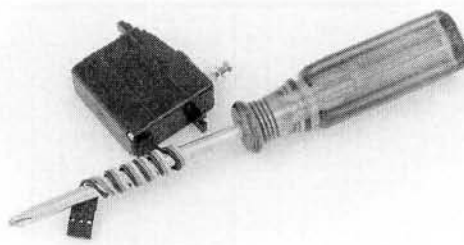
turn be close to the motor. The servo should be right up in front with the steering system, and the receiver should be close to the ESC and servo. OK, so it's not brain surgery. It's often easier said than done, however.

THE LONG AND THE SHORT OF IT

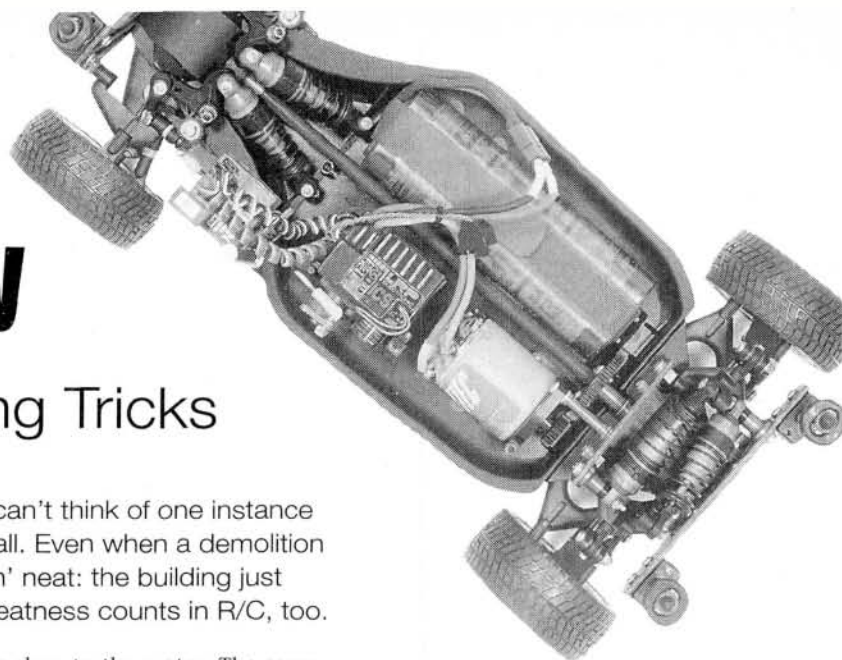
Most of the trouble with R/C car wiring is caused by the servo leads. Most servos come with much more wire than is necessary for R/C car applications. The extra length is great for airplane wings and fuselages, but we ground-bound types don't usually place our servos more than a few inches from the receiver. This makes for a lot of servo-spaghetti flopping around under the body shell, and it snags, gets tangled and causes glitching. Servo leads can be shortened, but (a) it's a pain, even more of a pain than putting in roll pins or assembling universals, and (b) once you've shortened the leads, you've probably committed the servo to the car it's in forever. There are two easy ways to keep those long leads in check without resorting to surgery: the coil method and the wrap method.

The Coil Method

The idea here is to make the servo lead look like a telephone cord. It's easy and it's fun! Well, at least it's easy. Just wrap the servo lead around a screwdriver shaft, slide the screwdriver out while you hold the end of the lead, then plug the lead into the receiver. The lead won't uncoil because both ends are held tightly and can't turn. Use this trick for servos that are placed three inches or more from the receiver—much closer than that, and the coil will ball up and look crummy.

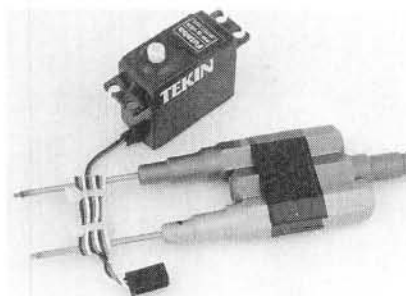


Screwdriver with servo lead coiled around it: wrap on, slide off. Wrap on, slide off. But Mister Miyagi, when am I gonna learn karate?



by Peter Vieira

The Wrap Method



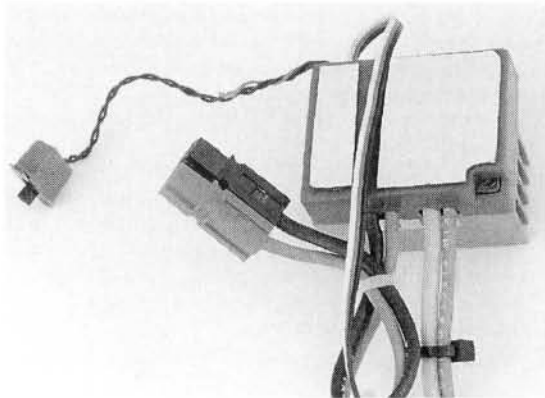
Two screwdrivers with lead wrapped around: here's a simple jig for folding servo leads. It's easy, and it gives your car that factory look.

This one is a no-brainer. Just wrap the lead up and zip-tie it. But if you're like me, you want that perfect, factory-fresh look, not a wad of wire with a zip-tie squeezing it in the middle. Here's a little trick I use to get that extra-sano look; it's really just a variation of the coil method.

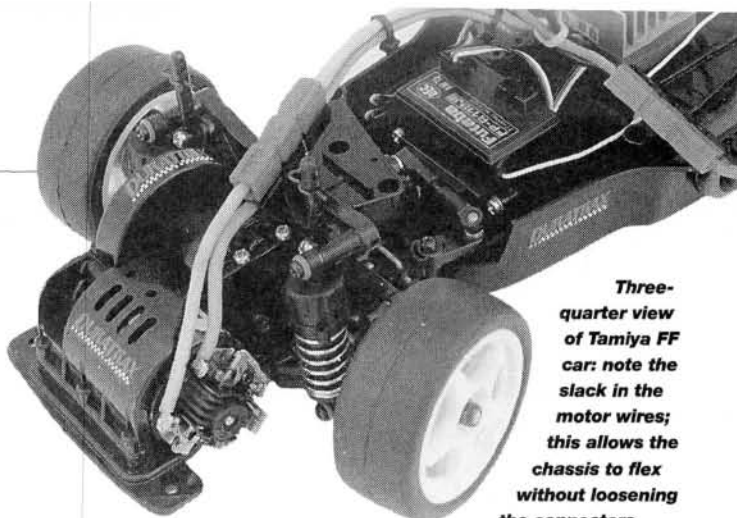
1. This time, you'll need two screwdrivers. Tape them together at the handles so that their shafts are parallel. If the shafts are less than an inch apart, you'll probably want to spread them out a bit; just put a spacer between the handles as I've done in the photo.
2. Now wrap your lead around both shafts, using your thumb and forefinger to pinch them together in the middle. A spare alligator clip or clothespin will come in handy here.
3. Finally, secure the wrapped lead with two zip-ties, then slide the lead off the screwdriver shafts. Nice 'n' easy.

Over and Under

Ideally, the leads coming from your servo and ESC should run along the chassis, not over other electronic components. With many of today's cars, however, this is often a difficult proposition. Case in point: my Tamiya* front-driver. I didn't want to put my Tekin* Rebel on top of the steering servo, as I wanted the Rebel's weight to help with rear traction. This left me with a dilemma: if I mounted the Rebel facing forward, the motor leads would have to arc over the heat sink. This would make an already long reach to the motor even longer, and the wires would saw themselves against the heat sink.



Underside of an ESC with lead and tape: make a tunnel when taping over leads; this will give the component a solid base instead of creating a seesaw effect with the wire as a fulcrum.



Three-quarter view of Tamiya FF car: note the slack in the motor wires; this allows the chassis to flex without loosening the connectors.

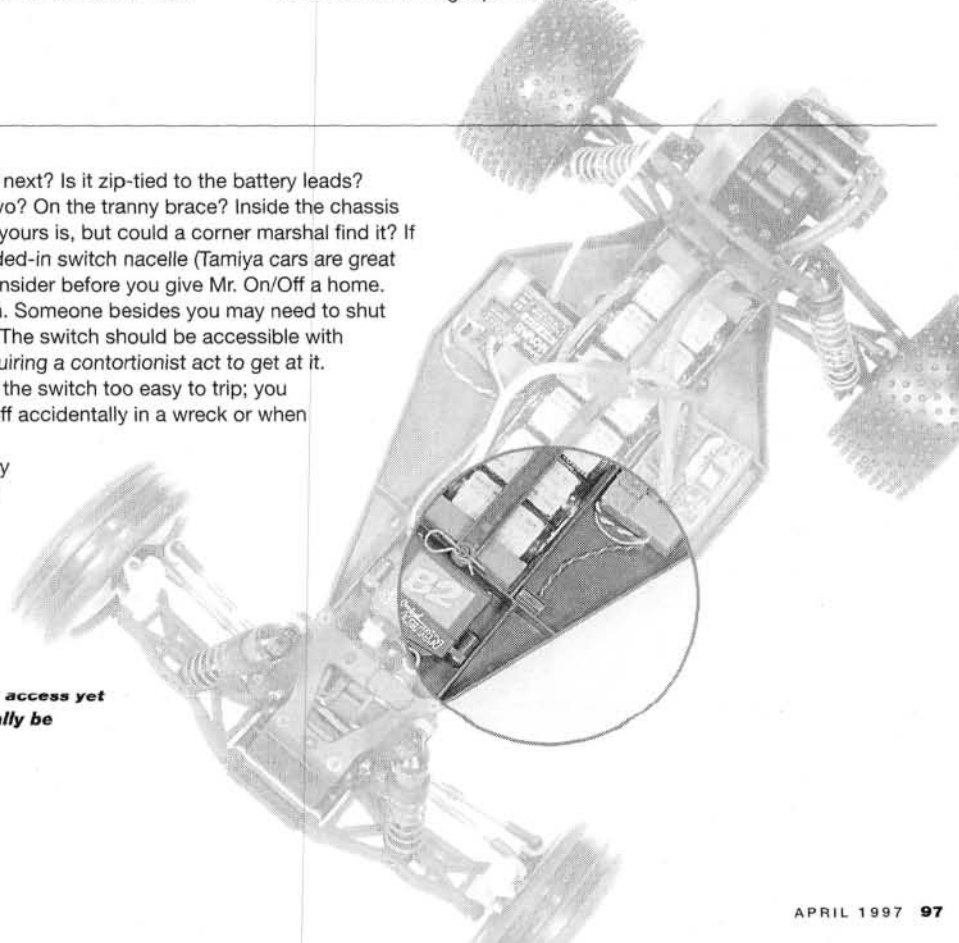
If I mounted the Rebel backward, I'd have a straight shot to the motor, but now the lead for the receiver would have to be sent over the metal heat sink—a glitchy arrangement.

Luckily, servo and ESC leads are pretty thin and flat, so they can easily go under other components, like my Rebel. But it's not a great idea to just slap a hunk of servo tape over the lead and stick a servo or ESC on top. Although thin, the lead will "high center" the part you stick over it and make for a lousy bond, but it *will* hold great until you're leading the A-Main. To really make it stick (pun intended), make a tape tunnel. Just place servo tape on either side of the lead where it passes under the component, then sandwich the lead in with another piece of servo tape cut to match the full width of the servo or ESC. Now you have a solid bond with the chassis and an out-of-the-way lead. By the way, use quality, hobby-grade servo tape; hardware store foam mounting tape doesn't cut it.

The Switch

Ah, the switch. Where will it appear next? Is it zip-tied to the battery leads? Stuck to the top of the steering servo? On the tranny brace? Inside the chassis tub? I'm sure that you know where yours is, but could a corner marshal find it? If your car doesn't have a handy molded-in switch nacelle (Tamiya cars are great for this), here are a few things to consider before you give Mr. On/Off a home. First, make it easy to find and reach. Someone besides you may need to shut your car down, probably in a hurry. The switch should be accessible with the body on, preferably without requiring a contortionist act to get at it. But by the same token, don't make the switch too easy to trip; you don't want the car to be switched off accidentally in a wreck or when it catches the pavement or carpet. With this in mind, I always set up my switch so that it is on when pushed toward the rear of the car.

The ESC switch should be easy to access yet mounted where it won't accidentally be switched on or off.

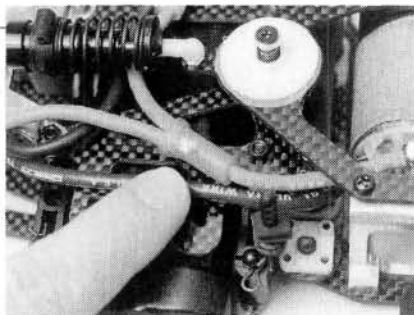


HOW TO WIRE NEATLY

Battery and Motor Wires

As you've probably read at one time or another, long motor and battery wires rob power. It's true, so you'll want to keep 'em short. But be warned: too short is even worse than too long. Pan cars are especially sensitive to short motor wires

because the motor pod must move independently of the main chassis. If the motor wires aren't long enough to allow full movement of the motor pod, the car will exhibit handling problems that cannot be tuned out. Worse, the wires may seem fine until a good whack jerks the pod hard enough to break a solder joint, pop the ESC off its tape, or rip out a wire. Do yourself a favor: add an extra $\frac{3}{8}$ inch to what looks like "just long enough." The same goes for fully suspended cars. Although both the ESC and motor are fixed to the chassis and don't move in relation to each other, chassis flex must be considered. If the motor wires are as taut as guitar strings, with the first hard hit, they'll either pop at the motor or pull your ESC off its tape.



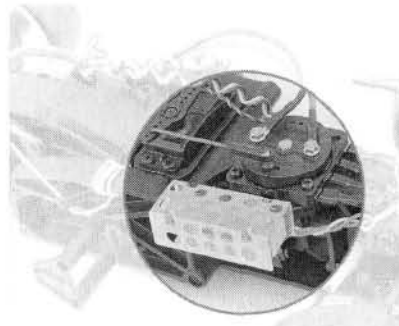
Here's a well-set-up Associated* RC12L—wrapped servo lead, coiled ESC lead and not-too-short motor and battery wires. I run Litespeed* connectors on everything.

Mechanical Speed Controls

Mechanical speed controls tend to be pretty messy affairs, wiring-wise. Wires to the battery, wires to the motor, wires to the resistors, another servo and linkage in there as well—it's a pain. Just try to zip-tie everything out of harm's way, but don't restrict the wires headed toward the motor; they need to be free to move with the wiper arm or rotary speed selector, like the one in the Kyosho* Mantis shown here.

That about does it! I hope you will find that your car is not only easier to work with, but also fun to look at. I like a hot-looking body as much as the next guy (I'm talking about R/C car bodies, Beavis), but I'm a chassis man at heart. There's nothing prettier to me than a freshly built car with a shiny new battery, glossy graphite, virgin tires and the latest gear set up clean 'n' tight. Leave the body off!

*Addresses are listed alphabetically in the Index of Manufacturers on page 193.



There's a lot of wire in a mechanical speed control setup; coil or tie what you can, but make sure that the motor wires and linkage are free to move.

FREWER FREWER FREWER FREWER FREWER FREWER



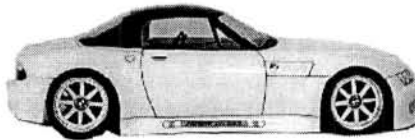
FR-4012
Acura/Honda Integra 2-door
with wing & decals for narrow sedans



Simply the best bodies for the
racer and scale enthusiast alike



FR-4010
Renault Laguna for narrow & wide sedans
(fits Tamiya Sedans, Yokomo, Kyosho, GP-10, etc.)



FR-4011
BMW Z3 Roadster with textured roof for narrow sedans
(comes with decal set)



FR-4009
BMW 318i for narrow & wide sedans
(fits Tamiya Sedans, Yokomo, Kyosho, GP-10, etc.)



FR-2006
Mini Cooper for Tamiya "M" chassis cars

Touring Car Bodies

- FR-4000 Mercedes C-180
 - FR-4001 BMW-M3 *
 - FR-4002 Alfa Romeo
 - FR-4003 Porsche 911
(now with optional wing!)
 - FR-4004 Nissan Silvia
 - FR-4005 Honda Civic *
 - FR-4006 Toyota Supra
 - FR-4007 Porsche 993
(now with optional wing!)
 - FR-4008 Mazda RX-7
(now with optional wing!)
 - FR-4009 BMW 318i *
 - FR-4010 Renault Laguna *
 - FR-4011 BMW Z3 Roadster *
 - FR-4012 Acura/Honda Integra *
- * = comes with decals

Coming Soon

- FR-4013 Ferrari F-50
- FR-7003 Japanese Sponsor
Decal Sheet

Japan R/C Imports

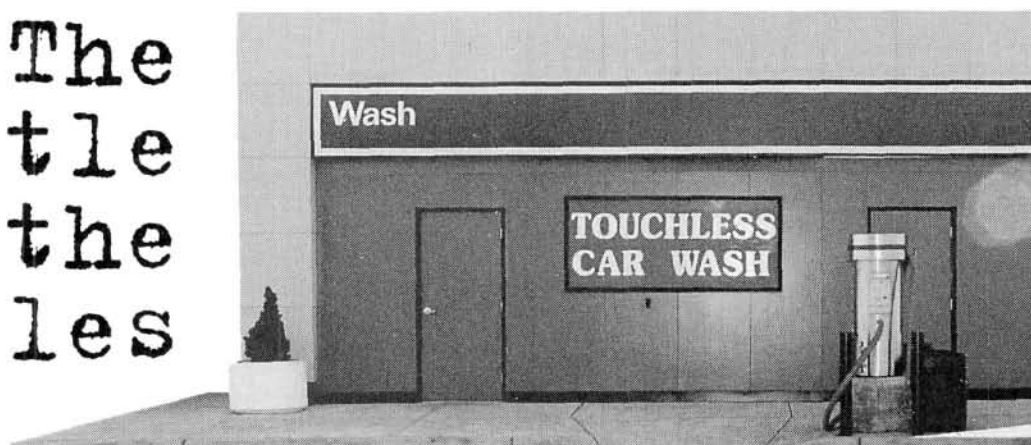
"Bringing You the best products
from around the globe"

PO Box 7009-152
Lafayette, CA 94549
Phone/Fax 510-284-5778

Send SASE with 52¢ postage for
free catalog

FREWER FREWER FREWER FREWER FREWER FREWER

The Battle of the Bubbles



Body Wash

by George M. Gonzalez

SHOOT

I KNOW WHAT IT'S LIKE to spend countless hours painting and detailing a beautiful, concours-winning R/C car body only to see it get bashed and crashed by nine other cars for what seems like an endless 4 minutes. This experience can be pretty traumatizing, to say the least. When the race is over, you pull the car off the track, and you notice that some of the decals have been partially ripped off, the fenders and quarter panels are all smudged up with tire marks, and the car is covered in a fine mist of road dust that makes your beautiful Lexan body look as if it's been to hell and back a few times. Now what do you do? Throw the body away? No way, man! Clean that bad boy up with some of the Lexan-body cleaning and waxing products that I'm going to tell you about.

Autographics*, Bolink*, Dan's RC Stuff*, Paragon*, Reedy* and Trinity* all manufacture body-cleaning/waxing products that are designed to clean your R/C car's body and make it shine. For certain tasks, some of these products work better than others, so it's important that you know exactly what each product will do and will not do. For this reason, I gathered up all the cleaning/waxing products I could get my hands on and tested every one until I was blue in the face. The results? Read on, my friends, and I will reveal all.

Bolink

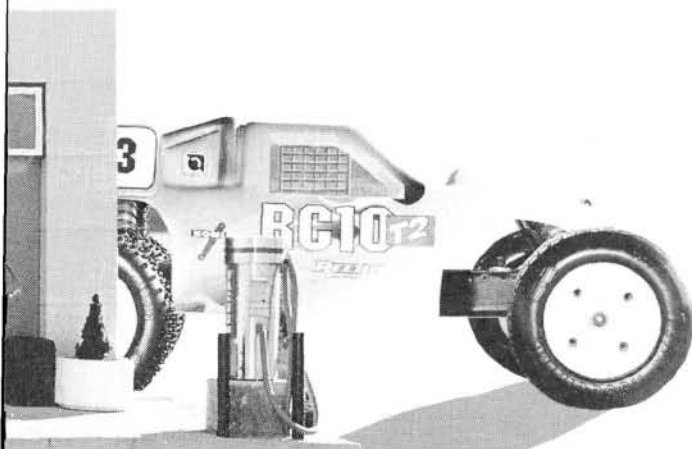
Body Wash, 50 MPH+ Spray Wax and Polish For R/C Bodies

I've been using Bolink's Body Wash for many years, and I honestly believe that no toolbox is complete without a bottle of it. It's the most powerful cleaner of the group and will even remove dry paint! With this in mind, you must be careful when you use it. The worst paint overspray, old detail lines and the most stubborn decal residue can all be miraculously—and effortlessly—wiped away. This product also easily removes stubborn servo tape. Use it on your toughest jobs.

Bolink's Polish for R/C Bodies was designed to actually fill in light scratches and remove minor tire marks. I tested it on some pretty scratched-up Lexan and found that it does indeed hide some scratches. It won't work miracles, though. Bodies with deep scratches will benefit from this treatment, but the scratches will remain visible. If you rub hard enough, this product will also remove detail lines and decal residue.

The polish works best if you apply the third product in the Bolink line-up—50 MPH+ Spray Wax—immediately after using the polish. Just spray the wax on, and then wipe it off. In minutes, your Lexan body will have a lustrous shine that actually reduces wind resistance. The best part is that the wax won't remove detail lines or harm decals.





Autographics Slick-Stuff

Developed by the Wax Shop exclusively for Autographics, this lives up to its name. For best results, clean the body with soap and water first, then dry it completely. Next, shake up the Slick-Stuff vigorously and spray a light coat over the body.

Wipe or buff the body with a clean rag to give it a lustrous, wet-looking shine. Repeating the process (adding more coats) makes the body even shinier. This product will not harm decals and will not remove trim lines made with a permanent marker.

Keep in mind that it wasn't designed to remove tough tire marks, decal residue, or paint overspray.

OUT



Trinity Body Blast

Almost as powerful as Bolink's Body Wash, this stuff will remove the toughest tire marks, decal residue and paint overspray with minimal effort. As with the Body Wash, care must be taken when you use Body Blast because it will remove detail lines and paint. It also polishes up extremely well and leaves your body shining like new. I highly recommend that you pick up Body Blast in a bottle. It's also available in an aerosol can. If you buy it in a bottle, you can put a little on a rag and then apply it sparingly. Overall, Body Blast gives you the best of both worlds—a strong cleaning formula that also provides a lasting shine.

Reedy Car Wash

This gives your body a wet shine just like the one you get with Autographics Slick Stuff. For best results, clean the body well with soapy water before you apply it. Unfortunately, if you apply it to a dusty body, you'll end up with a dull, messy finish. It will remove tire marks, decal residue and detail lines, but it will take a little more effort than some of the other cleaners. Oh, and did I mention that this stuff smells like an orange? That's because it contains citrus extracts. Overall, if used as directed, Reedy's Car Wash works excellently.



Safety Tips

Care must be taken when using these products; in fact, as R/C car racers, we use a lot of chemicals that can be harmful if misused. Here are a few words of wisdom on safety.

- **Don't drink or inhale any of these products.** I have to admit that Reedy's Car Wash smells pretty appetizing, but try to resist the temptation.
- **Be sure to work in a well-ventilated area.** Some of these products have powerful fumes.
- **Some of these products are highly flammable, so don't work near an open flame.** And for God's sake, please don't smoke when you use them.
- **Wear rubber gloves.** I know, I know. Sounds like a drag, huh? Listen up, my friends: we care about your health, and so do your loved ones, so be sure to protect yourself. Some of these products contain chemicals that can be absorbed by your skin and distributed throughout your bloodstream.
- **Read all the safety precautions that are printed on the label.** If you get some of the product in your eyes, seek medical help immediately.
- **Keep these products away from small children.** Some have colorful labels that are like magnets to young tykes. Keep the products locked away or stored in high places where kids can't get their mitts on them.
- **Eat an apple a day to keep the doctor away.**
- **Don't run with scissors in your hand.** OK, I'll stop now so that you can move on to some of this issue's other fine articles.

WORLD CLASS BATTERIES

"20" NATIONAL CHAMPIONSHIPS

SANYO RC-2000 H.O.H.V. PACKS SPIKED PACKS

CALL FOR PRICING AND
AVAILABILITY!!

THUNDERBOLT

24 DEG. STOCK MOTORS

3050 VORTEX TUNED \$24.75
3350 EPIC BLACK TUNED 24.75

THE ORIGINAL H.O.H.V. PACKS AVAILABLE!!

CALL FOR PRICING!

**WE TALK R/C RACING!!
ALL PRODUCTS
GUARANTEED!**

WORLD CLASS

8021 JAMES COURT
NIWOT, CO 80503 USA
PHONE: 303-652-3038
FAX: 303-652-2369
MC-VISA-COD-PREPAID

BODY WASH SHOOTOUT

Paragon Slip Stream Body Cleaner and Wax

Used by many top oval and superspeedway racers to keep their bodies as clean and aerodynamic as they can be, this has been around for over a decade. Using it is a two-part process. First use Slip Stream Cleaner to remove road dust, tire marks and small scratches. You won't have to rub hard to remove tire marks; you just wipe them away. Be careful, though, or you'll easily wipe away detail lines applied with a permanent marker as well. Stubborn stains and decal residue will require more effort, and this product will not remove paint overspray, no matter how hard you rub.

Next, apply the wax. Do this just as you'd wax a full-size car—but it isn't as tiring! Simply put a little wax on a clean, soft rag and spread it over the body. The wax will dry to a dull finish almost immediately. Finally, buff the waxed body with a soft cloth. Voilà! You have a Lexan body that has a mirror-like finish that cuts down on wind resistance.



Dan's RC Stuff Speed Spray

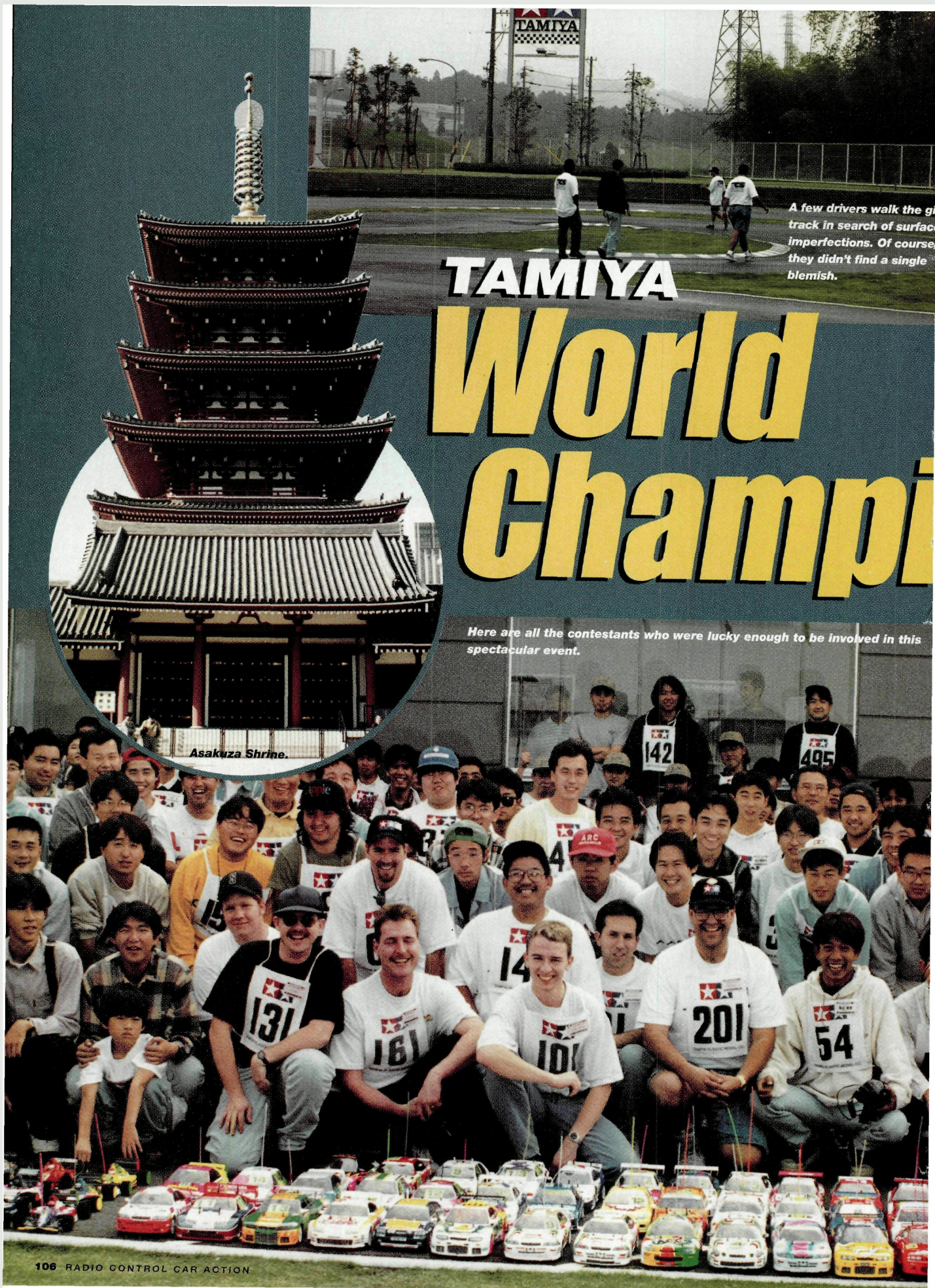
This has so many uses that you may end up using it as much for household cleaning as for cleaning R/C car bodies. It's great for those dusty off-road applications. Immediately after you've raced your off-road car or truck, spray Speed Spray on the dirt-covered body, and then watch the foam do all the work. Next, wipe the body with a clean rag, and you're finished. Speed Spray will effectively remove all the dirt and leave your vehicle clean and ready to be dirtied once again. It's also anti-static. Hmmm What happens if you rub your feet really hard on carpet, then touch your car? I guess if you use Dan's Speed Spray, you won't get shocked by static electricity. It doesn't remove detail lines made with permanent markers, and this is nice; but it doesn't remove decal residue, paint overspray, or tough tire marks either.

Best of the Best

I was pleasantly surprised to find that all the products I tested in this shootout lived up to their manufacturers' claims. I have to admit, however, that some worked better than others at certain tasks. After hours, days, months and even years of testing, here's my verdict.

- **Best shine:** tie between Autographics Slick Stuff and Reedy Car Wash.
- **Best at removing decal residue, tire marks and wall scuffs:** Bolink Body Wash; Trinity Body Blast was a very close second.
- **Best at removing small scratches:** Paragon Slip Stream and Bolink Polish for R/C Bodies tied.
- **Best at removing paint overspray:** Bolink Body Wash.
- **Best all-around multipurpose cleaner:** Trinity Body Blast (in a bottle).
- **Easiest to use:** Dan's RC Stuff Speed Spray.

*Addresses are listed alphabetically in the Index of Manufacturers on page 193. ■



TAMIYA

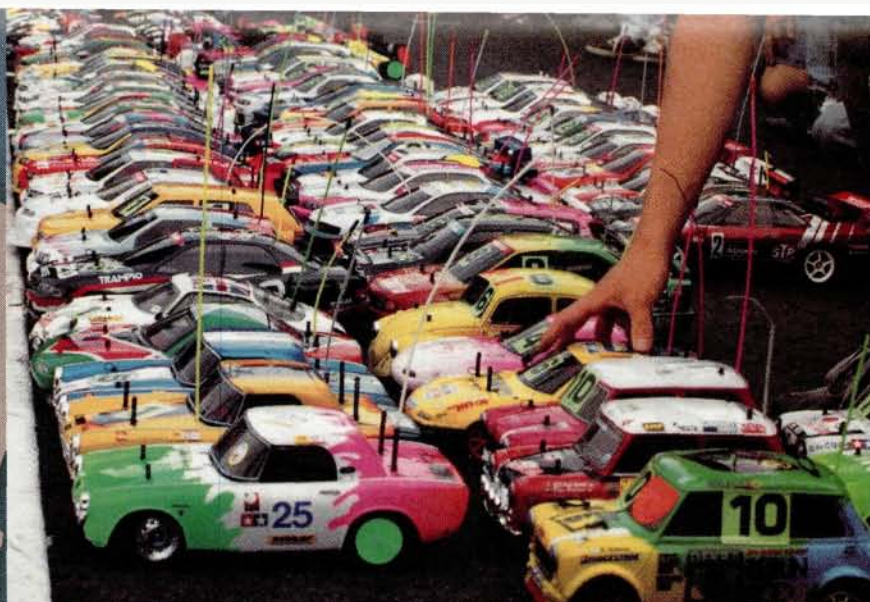
World Champion

A few drivers walk the track in search of surface imperfections. Of course they didn't find a single blemish.

Here are all the contestants who were lucky enough to be involved in this spectacular event.

Asakusa Shrine.

U.S. Champs Take on the World



All the cars line up for the concours judging. Wow!

onships

by Eric Sands

DID YOU EVER want to find out just how skillful a driver you really are? Did you ever have the desire to visit the company that invented scale R/C racing? In other words, did you ever want to race in Japan?

Japan is the site of the Tamiya World Championship. In '96, for the first time, it was held at Tamiya's new Kakegawa Circuit, about an hour's drive from Tamiya headquarters in Shizuoka. One quick look is all you need to be convinced that this is the largest 1/10-scale electric track in the world—until someone fires up a Tamiya TGX 1/8-scale gas car; then the track suddenly looks small.

As event coordinator for Tamiya America, I made the trek to the Land of the Rising Sun to accompany the Tamiya U.S. champions who went to knock heads with the European and Japanese champs for the world championship title. Representing the U.S. were:

- F1 champion Garrett Yazell. He's also known as "Wild Child"—an appellation that I hung on him; he doesn't like it, but I do,



Above: USA F1 champ, Garrett "Wild Child" Yazell was recognized in the concours event for his stunning F1. Left: the American champs (left to right): Garrett Yazell (F1), Steve Nguyen (M-Chassis), Fred Medel (FWD) and Scott Ernst (4WD). Moto Suzuki (far right) from Tamiya Japan was their official "Baby Sitter."



TAMIYA WORLD CHAMPIONSHIPS

so what the heck! He earned this honorary title through his boundless enthusiasm for almost everything and his distinctively Southern California dialect.

- FWD champion Fred Medel, who was so at home in Japan that it wouldn't surprise me if he moves kit and kin back to Japan in the next few months. Fred was also the team neatnick.

- 4WD champion Scott Ernst, who is such a devoted husband that he actually took his wife on the one-week trip away from home! Scott owns a hobby shop/race track back home in Glendale, WI, so he really knows his stuff.

- M-Chassis champion Steve Nguyen left his wife at home. Boy, is he going to get it when she finds out that Scott Ernst took his wife along with him! Steve must have been a Boy Scout; he had enough equipment for every eventuality.

DAY ONE

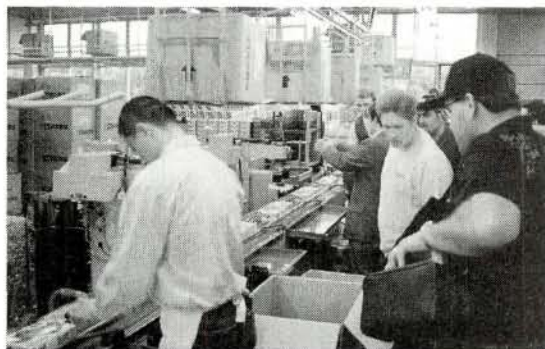
The track was wet after some unexpected rain, so the drivers used the down time to practice with their handout motors and batteries. For the first part of the day, the U.S. drivers shared the track with the European champs, so eight cars battled it out even before the race began.

When the track was just about dry, the American champs threw their cars out

onto it. Everyone—particularly U.S. drivers Garrett and Scott—had help from the experts. Garrett had some help with his Tamiya F103 F1 from its designer and one of Japan's top racers. They helped him with tire selection and some general setup tips. After a few false starts, Garrett's times were faster than the Japanese champions'. (I guess he's a good student!) This caused quite a stir in the pits and a sudden rise in expectations for this Southern Californian.

Though Scotty's lap times in 4WD were on a par with those of the European champion, for some reason he wasn't content with his car's performance and felt that he could go much faster. Ari—one of the designers of the Tamiya TA03—gave him some setup tips. Together, they made small improvements for each run.

Looking for a way to carry more speed through the corners, Fred tried every known setup. He stayed calm and deliberate, and his pit area stayed way too neat. He and the European FWD champ compared notes and worked together to find



The American and European champs got a rare opportunity to check out the Tamiya factory firsthand. A lone worker works the assembly line.

the best setup. You don't see that often in the U.S.

Steve is a lot like Fred. He systematically tried different setups for his M-chassis car: FWD, RWD, shock oil, swaybars, no swaybars, etc. With each setup he came up with, he gained valuable experience.

With the first day's practice over, it was time to have fun, relax a little, have dinner and then go back to hotel rooms and work on the cars. Moto Suzuki was our official baby-sitter (really, "Baby Sitter" was printed on his shirt!). He was responsible for getting us where we had to go and making sure that we were fed when we were hungry. As a member of Tamiya's International Division, Moto

ON THE INFORMATION SUPER

Cursor to the button, Pedal to the metal

On the information superhighway there are no speed limits. When you log onto the Serpent TSN Internet web site, you move into the fast lane of cyber R/C: Detailed information on car dynamics and tuning, timely race reports, even a racer forum for you to discuss R/C subjects on a global scale. The only real limits are how fast you want to go, and how much fun you want to have.

If you're into R/C, check out the Serpent TSN internet site. Because the track isn't the only place where Serpent is speeding.



<http://www>

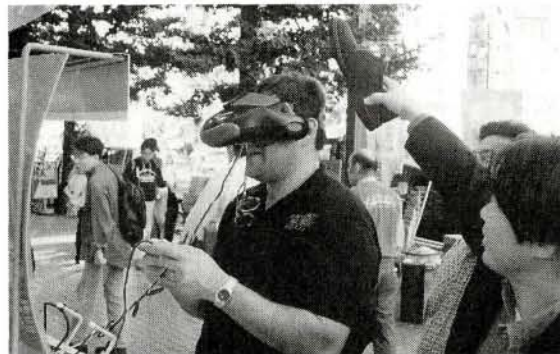
usually has many more important things to do but he took good care of us throughout the race. We could not have had a more amiable host. That night, he took us to a small restaurant specializing in tempura, which is deep-fried shrimp, eel, fish and vegetables in a very light batter—outstanding.

DAY TWO

Day two saw more rain, but it didn't last long. The track seemed to absorb the moisture like a sponge and racers were soon practicing again. To gain speed, the

racers tweaked their cars and then tweaked them some more. Most of this tweaking involved making the cars as light as they could be. Tamiya's minimum weight specification was lower than expected, but racers hesitated to cut their beloved cars too much. Nevertheless, with the carrot of more speed dangling in front of them ... gentlemen, start your Dremels!

With the exclusive practice over, controlled practice began. Fred and Steve were happy with their setups, but in an effort to improve on perfection, they continued to dial in their cars. Unfortunately, Garrett's F1 was slower than it had been on the previous day, and compared with the Japanese drivers' cars, Scotty's TA03 was just crawling. Steve's lap times in M-Chassis class were a full 3 seconds better than they had been the day before. Apparently, all that hacking and lightening had made a big difference. Steve was a very happy camper and so was Fred; they were the only two U.S. drivers who had their cars totally dialed. Fred



American driver Scott Ernst had to be pried off this virtual reality racing game. Baby-sitter Moto had to hit him over the head with his shoe to get his attention.

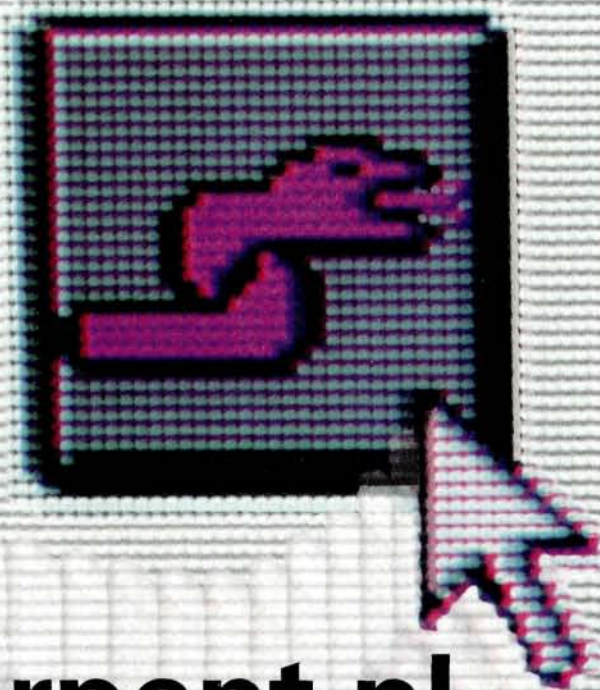


Is this an awesome drivers' stand and timing tower or what? The Japanese know how to put on a first-class racing event.

formed a partnership with Sornen, the Danish FWD champ—"Team FWD." They shared their setup ideas and discussed possible new setup strategies. I was very happy to see this kind of camaraderie.

Steve picked up a tip on touring car and M-chassis tires from local driver and 4WD world champion, Sato. It seems that rubber tires tend to balloon out (expand) when rotating at high rpm. To remedy

HIGHWAY... WE'RE SPEEDING



serpent.nl

- Car set-up articles
- Track guides and set-ups
- Downloadable files
- Latest products info
- Race calendar and reports
- Links to R/C internet
- Experts' columns
- E-mail with the team
- PC race competition
- Prize-winning quiz
- and much more.....



SERPENT by The Netherlands
SERPENT USA, Inc. Miami, Florida

TAMIYA WORLD CHAMPIONSHIPS



We're not too sure about U.S. champ Fred Medel. Whenever he went outdoors, he was attacked by pigeons. I guess the Japanese birds like his American scent.

this, Sato first sticks strapping tape to the inside of his tires, then applies a layer of double-sided tape to the strapping tape and then attaches the foam insert. The fiberglass in the strapping tape prevents the tire from ballooning, and taping the insert into place prevents it from moving around and bunching up inside the tire. Sato performed his magic on a set of Mini tires for Steve and then for his competitor, Scotty. In my book, he definitely won the sportsmanship award.

Opening ceremonies brought the event into focus. Racers represented five countries. Each of the American, European and Japanese champions was introduced by name and given a round of applause. Obviously proud to represent their country, the U.S. racers seemed to grow an inch or two in front of the receptive crowd. Those were my boys. I've known each of them for quite a while. Some have raced the TCS Series since the very beginning, and some I consider good friends. In spite of myself, I started to mist up a bit—darned sun in my eyes!

Their cars were lined up and grouped according to class, and the Concours judges went to work, inspecting each car and interviewing the owners. There was no award for this—just recognition. Garrett's Stars and Stripes F1 paint job was honored.

RACING ACTION

There were three rounds of qualifying—two on the first day and one on the second. All the racers tried for the best single lap award. This, of course, meant that they might be running a different setup from the one they would use for the finals. Scotty went for a ballistic, 11-turn motor, which he hoped would solve his

speed problem. Everyone else ran pretty close to their optimum setups, as they were required to run the handout motors.

After two rounds of qualifying, Fred and Steve were the highest ranked Americans—both at fourth—and Garrett, because of some car/track problems, could do no better than 23rd. Scotty drove very well but only placed 17th. This class proved to be very competitive, and Scotty was still underpowered.

The next day came around, and I decided to catch a little TV before heading out to the track. What did I find on one of the channels?—R/C car racing. There's no doubt in my mind that R/C racing is popular in Japan; it even gets national TV coverage. Gulp!

At the track, the tension was palpable. Everyone was a little quieter and a little more focused. Even the Americans, who

Winners



The F1 winners (left to right): K. Gutschau (second), T. Sakuma (first) and T. Arakawa (third).



The FWD winners (left to right): H. Naruoka (second), S.B. Holst (first) and I. Aikawa (third).



The 4WD winners (left to right): A. Yamaguchi (second), A. Aoki (first) and Y. Kobayashi (third).



The M-chassis winners (left to right): D. Hisada (second), Y. Sato (first) and I. Diboll (third).

F1

Final	Name	Country
1	T. Sakuma	Japan
2	K. Gutschau	Germany
3	T. Arakawa	Japan
4	K. Yokose	Japan
5	S. Suzuki	Japan
6	K. Ushirodani	Japan
7	T. Mitsunari	Japan
8	T. Unno	Japan
9	M. Furuya	Japan
10	G. Yazell	USA

FWD Sedan

Final	Name	Country
1	S.B. Holst	Denmark
2	H. Naruoka	Japan
3	I. Aikawa	Japan
4	N. Kamiyama	Japan
5	T. Iwamura	Japan
6	F. Medel	USA
7	N. Kameda	Japan
8	T. Yasuzawa	Japan
9	K. Ujile	Japan
10	H. Negishi	Japan

4WD Sedan

Final	Name	Country
1	A. Aoki	Japan
2	A. Yamaguchi	Japan
3	Y. Kobayashi	Japan
4	H. Koide	Japan
5	Y. Itoh	Japan
6	K. Aoki	Japan
7	S. Shimabukuro	Japan
8	Y. Matsumoto	Japan
9	W. Sesterhenn	Germany
10	K. Aikawa	Japan

M-Chassis

Final	Name	Country
1	Y. Sato	Japan
2	D. Hisada	Japan
3	I. Diboll	Great Britain
4	S. Nguyen	USA
5	Y. Kamiyama	Japan
6	K. Matsubara	Japan
7	M. Kiribayashi	Japan
8	K. Matsuo	Japan
9	Y. Arakawa	Japan
10	K. Sasase	Japan

had a reputation for having fun and enjoying themselves, were noticeably more quiet. There was one more qualifier on this day, then two finals. Regardless of how poorly the champs did during qualifying, they were still assured a spot in the finals. There were 20 cars in each final, so a back-of-the-pack start would be undesirable. If a driver was to have any chance of winning, he would have to be in the front half of the field.

With the last qualifier over, Garrett moved up to 17th place, and Scotty found himself in 20th. Steve stayed at fourth, and Fred dropped to sixth. Fred's new friend Sornen qualified first even though Fred's car was just as dialed. Scotty, on the other hand, knew that he did not have the speed to keep up with the Japanese. He took small consolation

(Continued on page 167)

14

WAYS
TO MAKE
YOUR
CELLS
LIVE
LONGER

by George M. Gonzalez

Your Guide to Battery Dischargers



YOU'VE PROBABLY heard from a reliable source that you should discharge your Ni-Cd battery packs completely before charging them again. Why is this? It has something to do with that cell "memory" thing, right? Correct! If, however, you run your R/C car until it slows to a crawl, chances are that the battery has been discharged well enough to avoid forming a "bad" memory.

But what if you ran the car only for 2 minutes then had to shut it off to go do something else, and when you returned, you decided to re-peak that half-dumped battery? Here's where the memory problems start. If this is done over and over again, the cells will develop a "step" in their discharge curve, and the pack will go flat (no punch) whenever it reaches that step. If you

are an intuitive racer, you will definitely notice that flat spot—especially if the flat spot happens at the beginning of the discharge curve. You'll wonder where all the "punch" went!

OK, if I run my R/C vehicle until it slows to a crawl every single time before I charge the pack up again, I won't have to worry about cell memory? The answer is yes, but you'll still have to worry about a couple of other battery-related terms: *cell reversal* and *internal resistance*. If you run your R/C vehicle down to the point where it barely moves, chances are you will discharge one or more of the cells in the battery pack to a point where it yields a negative voltage (cell reversal). Sure, once the battery pack has been disconnected from the vehicle, all the cells will miraculously go back up to their advertised voltage (typically 1.2 volts).

But each time a cell is brought down to a negative voltage, its internal resistance will increase. As the cell's internal resistance increases, its capability to release energy will be severely compromised. As a result, the cell delivers less voltage and takes longer to discharge.

Is there a proper way to discharge your cells so that you won't have to worry about cell memory, cell reversal, or increasing the cell's internal resistance? The answer is yes, and you don't have to be a rocket scientist to properly discharge your cells.

There are many different battery discharging devices designed to keep your packs working like new. We've gathered up all the dischargers we could get our hands on and tested each and every one to find out which work best. If you want your cells to last a long time, read on.

YOUR GUIDE TO BATTERY DISCHARGERS

BULB DISCHARGERS

Bulb dischargers are probably the most popular load devices because they are easy to make, relatively inexpensive to buy and they discharge battery packs very quickly. Bulb dischargers differ from tray-type dischargers because they do not discharge each cell in the battery pack individually; all the cells are drained at the same time. If you use only stick packs, bulb dischargers are the only way to go. Bulb dischargers are also the only way to go when you need immediate discharge capabilities—like on race day when you don't have 45 minutes of spare time to discharge a pack with a discharge tray.

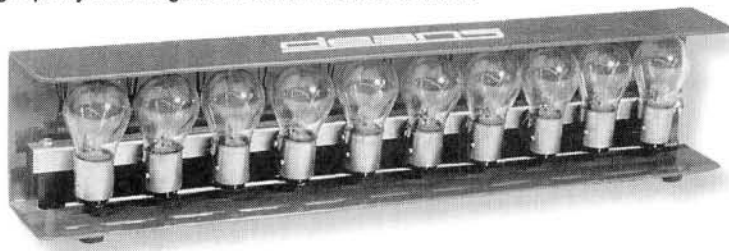
The only problem with bulb dischargers is that they don't know when to stop (unless you team them with a cut-off device). For this reason, care must be taken when using bulbs to drain your packs. The moment the bulb's glow starts to dim, remove the battery pack from the load, or you might damage it. The most common damage associated with over-discharging with a bulb-type discharger is cell reversal, which leads to increased internal resistance.

Most bulb dischargers use 10 to 15 12V automobile brake lights wired in series. Each bulb draws a 2A load, so having 10 bulbs in series will provide a 20A load (12 bulbs will provide 24 amps, and 15 bulbs will provide 30 amps). Keep in mind, though, that the actual load will decrease slightly as the battery is discharged.

Deans Battery Discharger

fully assembled—part no. 2031, \$44.95;
kit—2030, \$29.95.

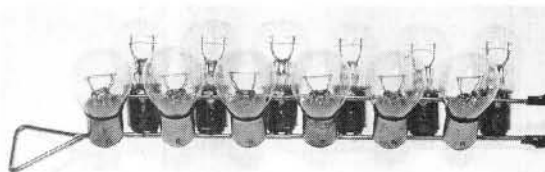
The Deans Discharger is definitely the Cadillac of bulb-type dischargers. The unit has 10 12V automotive bulbs wired in series, which draws a healthy 20 amps. The bulbs are safely nestled inside an aluminum case, so the chance of breaking one or more of the bulbs is highly unlikely. The aluminum case also makes a great car stand, so you're actually getting two products when you pick up a Deans Discharger. It's available fully assembled, or in kit form, for those of you who would like to save a few bucks. Deans high-quality Ultra Plugs are included with both versions.



Motor Man* Dumper

part no.—MM1500, \$32.

The Motor Man Dumper has 12 automotive light bulbs wired in series, which provides 24 amps of power-draining load. The light bulbs are soldered to a piano-wire stand so they won't fall over and make contact with other materials that might melt or be damaged by the intense heat that the bulbs put out—a very nice touch. The Dumper comes equipped with a Tamiya*-style battery plug, and that makes it perfect for sport packs.



PHOTOS BY WALTER SIDAS

BATTERY LINGO

• **Capacity**—the length of run time the cell or cells will yield; usually measured in real-time seconds or milliamp hours, e.g., 1700mAh.

• **Load device**—any apparatus that draws current from (drains) the cells—could be a bulb-type discharger, a battery charger with a discharge function, an electric motor, a fan, etc.

• **Voltage**—how much of a cell's capacity is delivered during a specific period. Higher voltage makes your motor run faster and produce more power. Most sub-C Ni-Cds typically yield 1.2 volts.

• **Peak voltage**—the highest voltage the cells attain during peak charging—usually, the cutoff point for most peak-chargers. A 6-cell battery pack may peak at 9.6 volts (1.6 volts per cell), but will immediately go back down to 7.2 volts (1.2 volts per cell) the moment the charger turns off. The

higher the peak voltage, the higher the internal resistance. Therefore, a pack that yields a slightly lower peak voltage is more desirable than a pack that exhibits super-high peak-voltage readings.

• **Cycle**—a process of repeatedly charging and discharging Ni-Cd cells at a certain charge and discharge rate—useful for training cells to yield either more run time or higher voltage (more punch). For instance, charging and discharging at lower amp rates will train the cells to yield longer run times. If you charge and discharge at higher amp rates, the cells will be conditioned to discharge more quickly to produce more power with less run time.

• **Dump**—is when you run out of battery power before the race is over; synonymous with “discharge.”

• **Milliamp hours (mAh)**—one thousandth amp-hour (Ah). An

amp hour defines how much current can flow at a rate of 1 amp per hour. We rate our cells in mAh because of the high amp draw of our R/C electric motors. Milliamp hours show how long it takes a cell to be discharged to a specified minimum voltage, i.e., its capacity.

• **Matched packs**—packs containing cells that have similar peak voltages, discharge times and internal resistance readings.

• **Internal resistance**—the cell's ability to release its stored energy. A cell with a lower internal resistance reading will provide more punch than a cell that has higher internal resistance.

• **Charge/discharge rate**—a charge rate is the rate in amps at which the cell is charged. The discharge rate is just the opposite; it's the rate in amps of the load placed on the cell to discharge it.

• **Discharge time**—how long it takes to fully discharge a battery

pack using a given load (usually between 20 and 30 amps) and a predetermined cutoff voltage. Although usually measured in seconds, some battery matchers measure discharge time in milliamp hours (mAh).

• **Cell memory**—occurs when a partially discharged battery is charged without having first been properly discharged. Repeated failure to properly discharge the battery may cause the cells to develop flat spots in their discharge curves, “training” them to dump prematurely.

• **Cell reversal**—occurs when one (or more) cells has been discharged to a point at which it yields a negative voltage reading (below zero volts)—also known as shorting a cell. The result is usually increased internal resistance, which also means that the cell could cause false peaking and other charging problems.

DISCHARGE TRAYS

Discharge trays differ from other load devices because they can discharge cells individually at an extremely low rate. This is a major benefit because the cells will end up with extremely close, if not exact, average voltages and capacity numbers—great for keeping your expensive matched packs as matched as possible. This process is also called “equalizing.” Of course, equalizing may only be performed on side-by-side, racing-style battery packs. Because of the way they are assembled, sport-type, stick packs cannot benefit from this process. For this reason, discharge trays are very popular among well-informed racers.

There is only one drawback to discharge trays: they take longer to completely discharge a battery pack. Most took more than an hour to discharge (equalize) a pack that was already 80-percent discharged. Discharging a completely charged pack is an overnight process. For this reason, discharge trays are seldom used on race days, when you need

immediate discharge capabilities (if you run your packs more than once per day, something many battery matchers caution against; but that’s another article!).

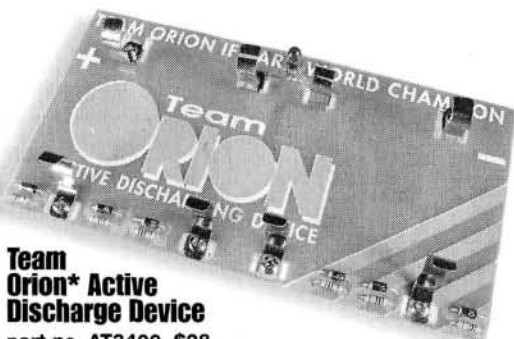
On the other hand, discharge trays are very useful when you aren’t racing. So that your cells will be as strong as possible, equalize them before that big race. On race day, use a bulb-type discharger with a cutoff device for your immediate discharge needs. All the discharge trays that we tested increased the battery packs’ capacity and average discharge voltage by a considerable amount, and that makes them a must if you’re serious about racing.

There are several discharge trays available, and manufacturers program in what they feel is the optimum discharge rate and cutoff voltage. Discharge trays can bring new life to your tired cells and keep your new cells performing at their best. Discharge trays are safe to use with 1400, 1700 and 1800 cells, as well as the new 2000mAh cells.

Trinity* Memory Buster Cell Discharger

part no. RC5009, \$29.99.

Trinity’s tray discharges cells at 1 to 1.5 amps depending on how much voltage is left in each cell. The unit is designed to cut off when a cell reaches a voltage between 0.5 and 0.75 volt. Trinity claims that the Memory Buster is safe to use after every race and typically takes 45 minutes to an hour to completely discharge an already partially discharged battery pack. You could also discharge a completely charged pack by leaving it in the tray overnight, but it’s best to partially discharge the cells with some sort of load device beforehand. Other features include a single, green, LED that lets you know when the unit is working; when the light goes off, the batteries have been discharged and the equalization process has been performed; the unit is self-powered; and a battery pack can be left on the unit indefinitely and will never discharge below the unit’s default settings.



Team Orion* Active Discharge Device

part no. AT3400, \$28.

This discharges each cell at a very low amp rate. The unit will cut off when each cell reaches 0.5 volt. Like when using the Trinity unit, it’s best to partially discharge the battery pack with some sort of load before you use the tray. A fully charged pack can be left on the tray overnight, or even indefinitely without suffering any damage. Other features include a red LED that lights up to signify that the unit is in use; when the light goes off, your batteries are discharged and should yield some very close numbers; and the unit is self-powered.

Pro-Match* Smart Tray

\$24.95.

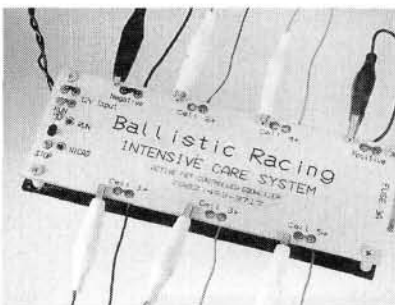
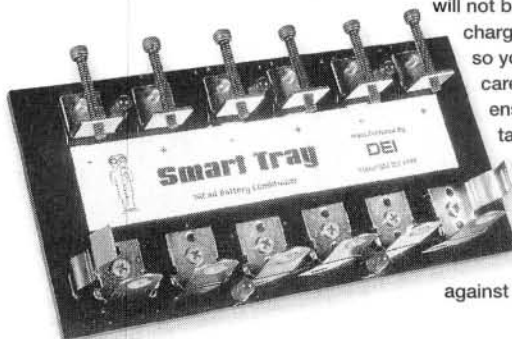
Radio Control
CAR ACTION
RECOMMENDED

This is a very smart discharge tray indeed. It discharges the cell at 0.45 amp and shuts off each bank one at a time until every cell has

been brought down to 0.5 volt. What sets this unit apart is that it has five LEDs instead of one. This is a great feature; if one of the battery tabs on the discharge tray doesn’t make contact with one of the cells, the corresponding light will not go on. This lets you know that one of the cells is not being properly discharged. The cell

will still be discharged, however—at the same time and discharge rate as the cell next to it. In other words, the battery pack will be completely discharged, but the cells

will not be equalized. The other discharge trays have only one light, so you have to be a little more careful when you use them to ensure that all of the tray’s tabs are making contact with the cells. The Pro-Match Smart Tray takes all the guesswork out of discharging cells. It also has a lifetime guarantee against defects.



Ballistic Batteries* Intensive Care System (ICS)

part no. 0005, \$99.

This unit is unlike any of the other discharge trays tested because it is the only one to use high-quality field-effect transistors (FETs) as load devices. For this reason, the ICS unit is in a league of its own. Ballistic claims that because FETs are more accurate than any other load device, each cell will be discharged more precisely, and that, in turn, will yield better results.

The ICS unit discharges each cell at a constant rate of 2 amps, and the unit will cut off at a low 0.01 volt. (this is as low as you can get folks; Ballistic claims this kind of reading can be attained only with FETs). Unlike other discharge trays, the ICS is not self-powered; you must attach its positive and negative leads to a 12V power supply. It has seven alligator clips that you attach to the battery tabs (bars) on your battery pack. It has a start and stop switch and is fuse-protected. Two LEDs are provided: the brightness of the red light shows the condition of the cells; the orange light indicates that the unit is running and automatically switches off when equalization is complete.

YOUR GUIDE TO BATTERY DISCHARGERS

CUTOFF DEVICES

When one of these cutoff devices is installed between your battery pack and your load device, you don't have to worry about over-discharging. When the battery pack reaches a certain voltage (typically 5.4 volts), the cutoff device switches off the load device.

If a 6-cell pack is brought down to 5.4 volts, that works out to 0.9 volt per cell. If a 7-cell pack is brought down to 5.4 volts, that would work out to 0.77 volt per cell, which is still an acceptable cutoff voltage. For this reason, most cutoff devices are suitable for 6- and 7-cell discharging. Discharging fewer or more cells is not recommended unless specified by the manufacturer. As with the discharge trays, it's best that you discharge battery packs that have been partially discharged beforehand—say, immediately after a race. It's not a good idea to discharge a completely charged pack because it puts unnecessary strain on the batteries, the bulb discharger and the cutoff device.

All of the cutoff devices we tested are extremely easy to use. Connect one end to your load device (typically a bulb discharger) and the other end to your battery pack. Some of the units tested don't even have an on/off button; the moment you plug in your battery pack, the discharging begins. Keep in mind that if you have already discharged your batteries below the 5.4V cutoff, some of the units mentioned here may not switch on. Some units will momentarily switch on and then immediately switch off, while others may make a temporary buzzing sound and then go quiet if the cells are already below the unit's cutoff voltage.



**Radio Control
CAR ACTION
RECOMMENDED**

Pro-Match* Battery Wizard Jr.
\$29.95

The Pro-Match Battery Wizard can be considered a "smart" cutoff device because it's the only computer-controlled unit costing under \$30. It's designed to stop the discharge when the battery pack reaches 5.4 volts. What sets this unit apart from the rest is that it has a small computer chip that reads the discharge slope and will shut off the discharge if a rapid decline in voltage is detected. In other words, if there's a bad cell in your pack, the unit will notice it and bring it to your attention. Other features: it's easy to use—no on/off switch; lifetime guarantee against defects.

MPH* Tracker

part no. MPH 70, \$ 14.99.

The Tracker is the smallest unit we tested, but don't let its size fool you; this is one hot little unit. It can be used with 4-, 6- and 7-cell battery packs, and it will not let the battery pack go below an average of 0.8 volt per cell. It's easy to use: install it between your battery pack and your bulb discharger, fan, electric motor, or any other load device, and press the start button. The Tracker is also the least expensive of the group. MPH Products also sells a product called the Track-Light (MPH 75, \$31.99) which includes a Tracker cutoff device and a 10-bulb discharger. This all-in-one unit will provide a 20A load when discharging 6- and 7-cell battery packs, and it provides a 15A load for 4-cell battery packs.



Deans* Black Box

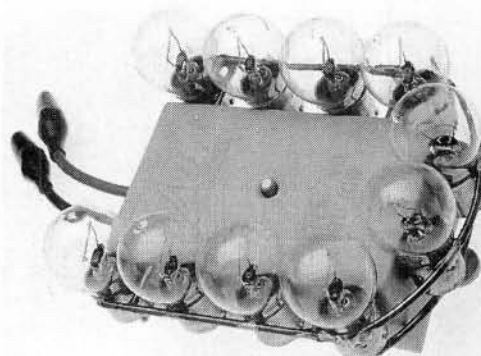
part no. 2035,
\$29.95.

This is an easy-to-use cutoff device that goes well with the company's bulb discharger. This unit can be connected to any load device and will switch off the discharge process when the battery pack reaches 5.4 volts. The unit has no on/off switch, so all you do is connect the unit between your load device and your battery pack to start discharging process. The unit also includes a set of Deans Ultra Plugs—a very nice feature.

Lazer Engineering* Flamingo Discharger

part no. BD106, \$65.

Here's another cutoff device that has its own load source. Ten 12V automobile brake lights are wrapped around a pink box that contains the cutoff device. The unit is designed to stop discharging when the



pack reaches 3.5 volts (an average of 0.58 volt per cell). This is the lowest cutoff rate of all the units we tested. Two alligator clips allow you to connect the unit to any battery pack, regardless of the connectors used. The unit is simple to operate; just press the start button and the discharge process begins. The unit can also be mounted inside your pit box to save valuable storage space.

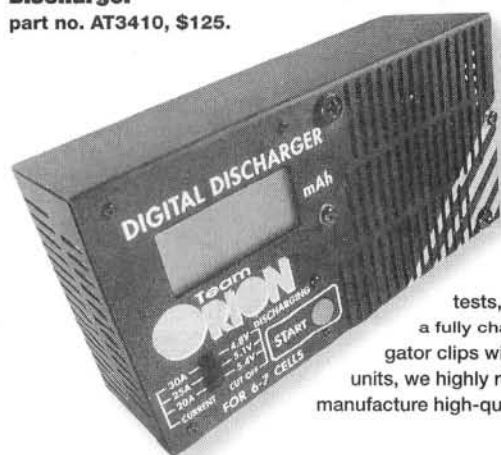
HIGH ZOOT DISCHARGERS

Are you *really* serious about your batteries' well-being? Then one of these high-end (read: more expensive) battery discharger/matchers may be in your future. These devices go beyond the conventional load-source/cutoff devices in that they represent computer-

controlled cell management at its finest. In addition to the models mentioned here, several other available charge/discharge/cycle machines were not included because they didn't fit into the "discharge only" outline of this guide.

Team Orion Digital Discharger

part no. AT3410, \$125.



The Orion Digital Discharger is one sweet unit. Designed for 6- and 7-cell use, the Digital Discharger has three preset loads for your battery discharging needs. Choose the 30A load to condition your cells for modified racing or discharge your cells at 20 or 25 amps for stock racing. The unit has three preset cutoff voltages that are user-selectable (4.8, 5.1 and 5.4 volts). This unit puts out a constant load that will not change during the discharge cycle. The unit is not self-powered.

The Digital Discharger features a digital display that shows the battery pack's run time in milliamp seconds. By using a simple mathematical formula, you can calculate the batteries' run time in real-time seconds. This information is very useful, because you can calculate how much time is left in your battery pack after each run (very helpful for determining proper gearing). You can also test fully charged packs to determine just how much run time the pack will yield according to the load you choose (great for rating your battery packs). The unit also has a built-in fan that keeps it cool while it's discharging.

The unit comes with a set of alligator clips that you attach to your battery pack. During tests, we noticed that the negative lead (alligator clip) smoked considerably when we discharged a fully charged battery pack at 30 amps; however, the unit never failed, and after we replaced the alligator clips with a high-quality Deans Ultra plug, the problem went away. If you decide to buy one of these units, we highly recommend that you install a high-quality connector. Deans, Litespeed* and AstroFlight* all manufacture high-quality connectors that can take the heat.

MPH Products Packrat

part no. MPH 100, \$159.

The MPH Packrat is by far the most elaborate battery-discharge system we tested. In fact, this unit has so many features that it would take

pages to list them all. The Packrat is a power management tool that uses an 8-bit microprocessor to precisely measure, recall and display the voltage/time characteristics of a single cell or a 4-, 6- or 7-cell battery pack. The Packrat is actually a cutoff device that you install between your load source and your battery pack. For the utmost portability, power the unit with a single 9V battery, or you can plug it into a wall socket with its included power converter—no separate power supply required.

The unit has a 32-character digital display that shows cells' run time, volts and amps discharged during the test. Once the cell or cells have been discharged, the display will give you information on the battery's average voltage and total time taken for the test. It will even show you the entire discharge curve of the battery pack to help you make gearing decisions. You can even have the unit personalized to display your name on the screen. This unit is so accurate that you can actually use it to match your own cells! I discharged every single battery pack I own (over 20) without a single rest. The unit never failed, and I now know which packs are good and which ones are dogs.

The Packrat can also be used to test and break in electric motors, and it will give valuable information on voltage and amp draw. Use the amp-draw readings to select the proper brush and spring for the races in which you compete.



Testing Tools

I used very few tools to test the worthiness of each of the dischargers featured in this article. I used two Tekin* chargers (BC67 and BC5A) to properly peak all my test packs. These chargers peak-charged over 100 battery packs during the course of my testing and endured hours of back-to-back charging. I used a large house fan to direct cool air onto the chargers while they were operating and to keep the bulb dischargers as cool as possible. I used my handy Radio Shack voltmeter to check voltage numbers. I also used the MPH Packrat (one of the units tested) to test the condition of the battery packs before and after they were equalized with the discharge trays.

Tekin DIS 350

part no. 5100, \$350.

Unfortunately, this discharger wasn't available in time for our tests, but we can tell you about its capabilities. The DIS 350 discharges, matches, tests and conditions cells. It will discharge 1 to 12 cells at an adjustable load of between 1 amp and 30 amps. It also has a built-in 5.4V cutoff, but for added flexibility, you can also program in your own.

The DIS 350 has three discharge modes that are used to train cells for different racing applications. It even includes a special Step Mode that varies the discharge rate to mimic how the cells would be discharged if they were actually installed on an R/C car and raced! A special 45A stress test checks for weak cells that might otherwise slip past an ordinary cycling load, but will fail when the pack is installed in an R/C car.

Other features include: self-powered when used with 6 or more cells; a digital display gives information on discharge rate, voltage and capacity in real-time seconds; a huge heat sink helps keep the unit cool when it's operating; it can be connected to Tekin's BC 112C charger to form a completely integrated charge/discharge, cycling system.

So there you have it. We hope that you will all go right out and pick up a battery discharger; this will be the best R/C investment you ever make, next to the purchase of a quality peak-charger. We honestly feel that all of the units

tested in this guide worked flawlessly and can comfortably recommend any of these products.

*Addresses are listed alphabetically in the Index of Manufacturers on page 193.

Tuning and Modifying the

KYOSHO TF-2

by Doug Mertes

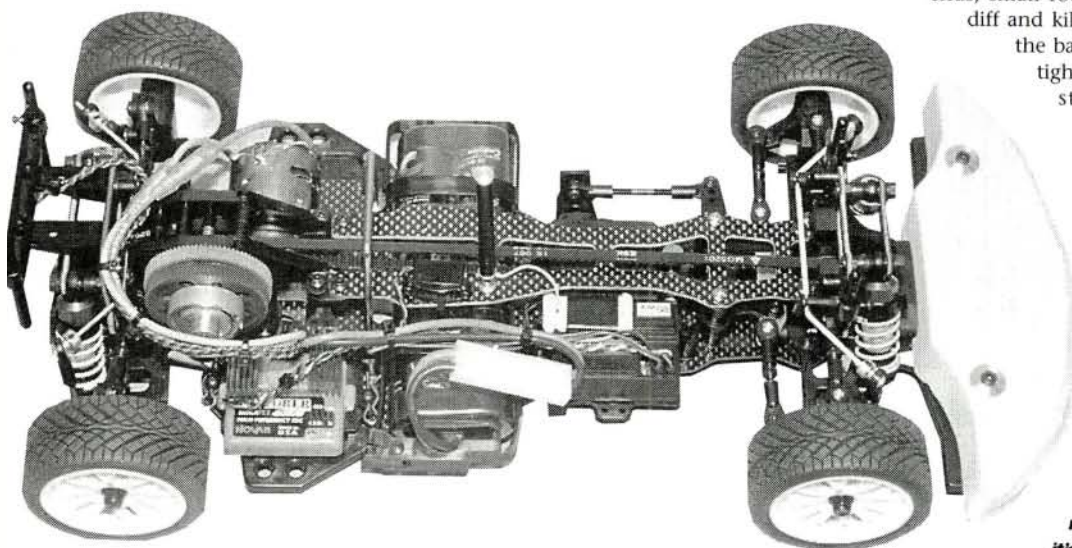


Kyosho's sizzlin' Nissan Skyline GT-R body fits the slightly wider than average TF-2 beautifully.

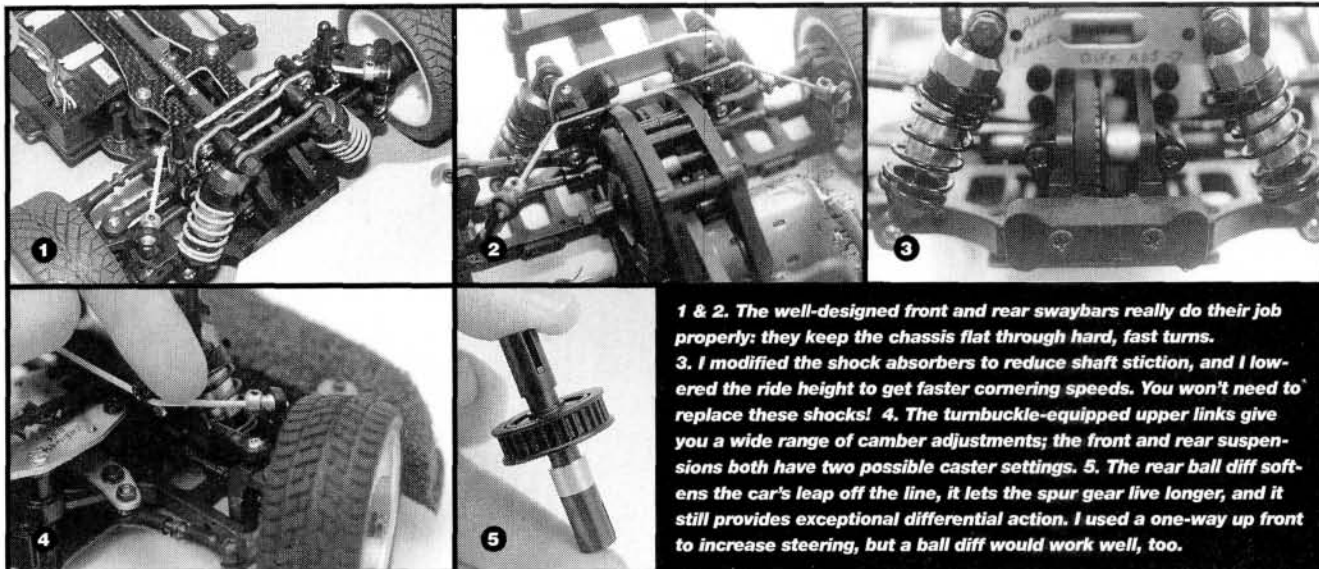
WITH THE INTRODUCTION of the TF-2, Kyosho*

showed their intention to become a force in the rapidly growing 4WD sedan category, which has exploded in popularity over the past two years. The TF-2 is truly a racer's dream; its features include a graphite chassis, beautiful aluminum shocks with purple-anodized caps, adjustable caster and camber and an admirably efficient belt-type drive train that cries out for the installation of some serious horsepower. Even though the TF-2 is a worthy competitor right out of the box, it can be substantially improved with a few extra parts and some suspension tuning.

- **Drive train.** When I first built the TF-2, I was surprised to discover gear differentials. Gear diffs are fine for entry-level vehicles, but their limited adjustability makes them out of place on a real racing sedan. Kyosho makes an excellent ball-diff-replacement assembly, so I picked one up for each end of the car. While I was at it, I also bought a one-way diff for the front end. This replaces the front diff and allows the front wheels to spin freely when the car travels forward. Between the two ball diffs and the one-way, I figured that I'd be ready for any tuning situation; one-ways typically increase steering on high-traction or carpeted surfaces, while a ball diff up front can eliminate oversteer when things get dicey. I really like the design of the diff bulkheads. Because they have open ends, small rocks and stones can't jam the diff and kill the belt—nice! I found that the ball diffs needed to be set fairly tight, especially when used with a strong modified motor, but they still provided great, smooth diff action. You can also adjust them without having to remove the entire diff unit; just drop one side of the suspension and insert an Allen wrench into the drive cup. While I had the car taken apart, I replaced the stock 48-pitch spur



I really like this Kyosho TF-2. On race day, if I'm running in the modified class, it's my best friend!



1 & 2. The well-designed front and rear swaybars really do their job properly: they keep the chassis flat through hard, fast turns. **3.** I modified the shock absorbers to reduce shaft stiction, and I lowered the ride height to get faster cornering speeds. You won't need to replace these shocks! **4.** The turnbuckle-equipped upper links give you a wide range of camber adjustments; the front and rear suspensions both have two possible caster settings. **5.** The rear ball diff softens the car's leap off the line, it lets the spur gear live longer, and it still provides exceptional differential action. I used a one-way up front to increase steering, but a ball diff would work well, too.

with a Kimbrough* 108-tooth, 64-pitch gear because I wanted to make sure I had plenty of gearing options. Durability wasn't an issue because ball diffs tend to absorb some of the jolts and impacts that a sedan experiences on the parking lot.

• **Suspension.** The kit's stock shocks use an internal pressure bladder to prevent the oil and air from mixing and foaming during use, and I found that they were pretty smooth from the very beginning. Kyosho includes a couple of sets of pistons with the kit, so to make the shocks even better, I only had to reduce the shaft stiction, prevent them from becoming pressurized and make sure that the ride height was correct. I removed the C-clips from the bottom of each shock and pulled out the O-rings and spacers. I slid one of the O-rings onto an old shock shaft and carefully sliced it in half with a sharp X-Acto blade (it was still a circle, but thinner). After I had reassembled the shock and installed my modified O-ring along with the unmodified O-ring, the shaft slid into and out of the shock body more easily, and there were no leaks. When

I reassembled the shocks, I also included an additional 3mm spacer under the piston to bring the car's ride height down where I like it. A lower stance usually results in higher cornering speeds, and I knew this baby would be shooting through the corners with some velocity! Finally, I drilled a 1/16-inch hole in the top of each cap to allow air to move freely into and out of the bladder's air space. This is an old trick from the days of Kyosho's Gold shocks, and it really makes a difference, especially if you race on black asphalt parking lots on hot days when shock oil tends to be less dense and takes up more space (expands).

I really believe in the value of a well-designed anti-roll bar system, and Kyosho makes a great one that's fully adjustable. It doesn't get in the way of the suspension components, you can disable it if it isn't needed (just remove one of the bar's links), and the bars are color-coded so that you can tell which one is thicker and which is thinner. Kyosho includes mounts for the front and rear of the car as well.

• **Electronics.** I installed a Tekin* 411P2 ESC and a Novak* NER3FM receiver, which never fails to deliver solid control, even in a hostile parking lot. I also installed some serious horsepower in the form of an Epic-based, 12-turn, triple-wind, modified motor from Extreme Motorsports*, and some of Elite Speed Products'* new PE voltage-enhanced Sanyo 1700SCRC Ni-Cds. Yeeeeeoww!

• **Where the rubber meets the road.** I finished these updates in time for the parking lot finale of the year, the Hobby Works Charity Race in Laurel, MD. These folks get a big crowd every Sunday, but their last race is really something special, and all the proceeds go to a charitable cause. I ran the TF-2 in the modified class, against a field of Yokomo YR-4s, HPI RS4s and some heavily tweaked Tamiya TA series cars. The competition was tough, but I still managed to

qualify in fourth position overall, and I finished fourth in the A-Main. I was running the only Kyosho car in the class that day, and people were very interested in the way it slid around the tight infield turns but still managed to reach ballistic speeds down the main straight. Using a combination of HPI radials and slicks, I had a ball that day, even though I didn't take home a trophy!

• **Other options?** If you'd like to dress up the car a little more, Kyosho can supply some really nifty graphite parts such as an upper chassis plate and front and rear shock towers. They also make an aluminum rollover bar to replace the black nylon one. Although this stuff looks cool, it won't really enhance the car's performance, so it isn't a necessity. Since Kyosho has released the new TF-2 Type R, you can actually purchase the chassis set up as you see it here but with a narrowed suspension that conforms to the IFMAR 190mm-width regulation. The narrow width also makes it easier to find replacement bodies for your car; the only ones I found that really fit properly were the wider ones from Kyosho.

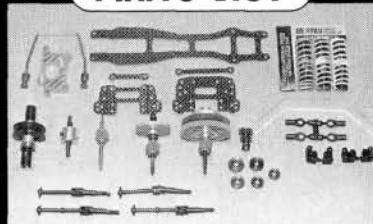
Although I did my best to thrash the TF-2 into submission, I wasn't able to break or wear out anything. The body I used for all my suspension-tuning tests and racing was the Kyosho Skyline body I painted for the original test, and it still looks great. The TD* Protector foam bumper pad that I mounted on the chassis prevented the front of the body from dragging on the pavement or splitting during the major mayhem that's a part of any race day on the lot.

When I originally built the TF-2, I said, "This is a car I would be willing to take to a regional or national-level race ... as it comes out of the box, this car is a winner." After living with it for a full racing season, I still feel the same way.

Wanna race?

*Addresses are listed alphabetically in the Index of Manufacturers on page 193.

PARTS LIST



FACTORY OPTIONS USED

- Front and rear swaybars.
- One-way front diff.
- Ball differentials for the front or rear.
- Shock spring set (soft to hard).

OTHER AVAILABLE OPTIONS

- Graphite front and rear shock towers.
- Graphite upper deck.

ERI Model Car Racing Distributor

OVER 200 COMPANIES
RC CARS SLOT CARS



MIGHTY MODIFIEDS
NOW IN THE NEW
YOKOMO SETUP

DURACOMM
22 AMP
POWER SUPPLY

FOREIGN DOMESTIC
ORDERS

FANTOM DYNO
THE "FACTS" MACHINE



CUSTOM
PAINTED
BODIES BY
JOSH

VANTAGE
DYNO

PRO SHOT
MOTOR SPRAY

DUMOR
SPUR GEARS

WOOD
X-13 CAR

SLIXX DECALS
NEW

FAST LANE
MODIFIED
BODIES

CARTOON NETWORK

A&L	Factory Works	Quantum
Aero Tech	Fast Lane	Race Prep
Airtronics	Gator	Racer Choice
Andy's	Holeshot	Racer's Edge
Associated	Hot Bodies	Racetech
Astro Flight	Hot Socks	Raceway mfg
Autographics	HPI	RCM
BBR	Hyperdrive	RCPS
BME	Irrgang	Robinson
Bandits	Kimbrough	RPM
Barracuda	Lightning Rod	Saiko
Beach	Lightspeed	Sassy
Bel-Ray	Litespeed	SMC
Bolink	Lunsford	Speedworks
BRP	Lupo	Stage III
CRC (Calandra)	Matrix (Integy)	TA Emerald
C&M/Cobra	Max Cell	TD Ent.
Cam	McAllister	Tamiya
Chicago Mod	MIP	Team Losi
Comp. Elect.	NMB	Tecnacraft
Comp. Craft	Novak	Teddy's
Cooper	Ofna	Tekin
Crowe	Ozone	Thorp
Dahm's	Paragon	Traxxas
Dan's RC	Parma	TRC
Dubro	Power Source	Trinity
Edge	Progressive	Twister
Elite Speed	Pro Line	Upscale
ESP	Protoform	Victor
ETA	Puretech	W.S. Deans

RC CAR SPECIALIST
Call for Slot Car Linesheet!

**DEALERS
only Please!!!**

CALL or FAX for Catalog and Newsletter
Phone (914) 268 5090 Fax 268 0462

50 North Harrison Ave. Unit 14
Congers, NY 10920

1997 RACE SCHEDULE

(Continued from page 84)



March 22	Paved Oval #2	Loki Raceway El Cajon, CA (619) 562-7757
April 5	Paved Oval Series #3	Showtime RC Speedway Bakersfield, CA (805) 589-0493
April 12	Off-Road Series #3 So. Cal.	Ranch Pit Shop Pomona, CA
April 12	Gas Off-Road Series #2	Ranch Pit Shop Pomona, CA
April 26	Dirt Oval #3	Ventura Road Runners Freedom Pk, Oxnard, CA (805) 529-6077
May 2-4	West Coast Paved Oval/Road Challenge	Western RC Las Vegas, NV
May 10	Off-Road Series #4	Ventura Road Runners Freedom Pk, Oxnard, CA (805) 529-6077
May 10	Gas Off-Road Series #3	Ventura Road Runners Freedom Pk, Oxnard, CA (805) 529-6077
May 17	Paved Oval Series #4	Encino Velodrome Encino, CA
May 24-25	Reedy/NORRCA Truck Race of Champs	Western RC Las Vegas, NV
June 7	Off-Road Series #5	Ranch Pit Shop Pomona, CA (909) 623-1506
June 7	Gas Off-Road Series #4	Ranch Pit Shop Pomona, CA (909) 623-1506
June 14	Dirt Oval Series #1 So. Cal.	Hot Rod Hobbies Saugus, CA
June 20-22	Dirt Oval Nationals	Kranzel's RC Raceway Lemoine, PA (717) 737-7223
June 28	Dirt Oval #5 So. Cal.	Ventura Road Runners Freedom Pk, Oxnard, CA (805) 529-6077
July 12	Paved Oval Series #5 So. Cal.	Encino Velodrome Encino, CA
July 19	Off-Road Series #6	Racers Haven Bakersfield, CA (805) 835-0441
July 19	Gas Off-Road Series #5	Racers Haven Bakersfield, CA (805) 835-0441

(Continued on page 183)

Test Dry-Cells

All "Double-As" are not equal

by Rick Eyrich



PHOTOS BY RICK EYRICH

MANY FOLKS rely on "double-A" Ni-Cd cells to power their transmitter, onboard receiver packs and, of course, sub-C Ni-Cd cells for their motors. They'll tell you that dry-cell (alkaline, non-rechargeable) batteries are too expensive to replace and they will die at the worst possible times.

But, on the other side of the coin, remember this: a vast majority of R/C vehicle owners want to just pick up their cars and enjoy running them! This means grabbing the car's radio transmitter and switching it on whenever they like. These people don't want to wait overnight for the Ni-Cds to charge; they usually use dry-cells.

So to test this dry-cell/Ni-Cd controversy, I purchased five widely available

types of AA dry-cell batteries: Duracell Powercheck Alkalines, Radio Shack Super Alkalines, Rayovac alkaline, Eveready alkaline and Walgreens non-alkaline. Walgreens?! The reason for this addition was simple: many R/C'ers believe all dry cells are the same. They purchase the cheapest batteries they can find and leave it at that. The testing procedures used here will tell whether all dry-cells are truly created equal.

Five brands of AA batteries were bought for this test—four big names and one generic. All five were checked for no-load and discharge time/voltage, and no rabbits were injured at any time.

TESTING PROCEDURES

My three separate check/tests required only the use of tools found in most R/C car toolboxes. A digital voltmeter (DVM) was the main item, and I created the other testing device specifically for this test.

First, I soldered a 30-ohm, 10W resistor to a pair of test-clip leads, then I soldered a 6V single-element auto bulb to the resistor/clip setup. I planned to use this tool to load/test each set of eight AAs mounted in a Futaba* transmitter battery holder.

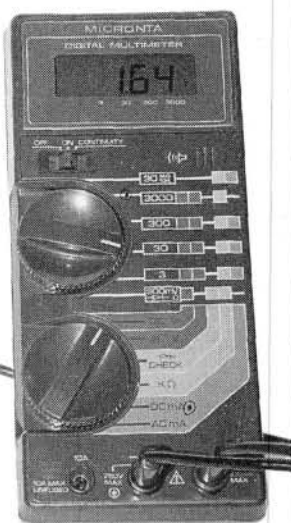
Test 1

SINGLE-CELL STATIC VOLTAGE

This one was easy. I removed one fresh AA from each pack and put it on the voltmeter for a no-load check of DC output. The idea here was to see how close each brand of battery would be to the 1.5 volts they're supposed to yield straight out of the package.

RESULTS

Walgreens	1.64 volts
Duracell	1.61 volts
Radio Shack	1.60 volts
Eveready	1.59 volts
Rayovac	1.57 volts



A single new AA cell from each brand of pack

was tested for no-load voltage. The generic AA showed the highest reading, but it didn't do as well when tested under a load.

Test 2

8-CELL NO-LOAD VOLTAGE OUTPUT

Now let's strap up and check the static voltage of eight new AAs right from the factory. The aforementioned 8-cell transmitter battery holder and voltmeter were again used to record the output.

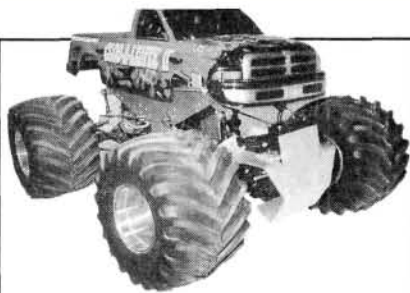
RESULTS

Walgreens	13.06 volts
Duracell	12.83 volts
Radio Shack	12.79 volts
Eveready	12.69 volts
Rayovac	12.69 volts



During tests, the four brands of alkalines all performed about the same, whether under a load or static. The generic AA brand did show some excellent no-load readings, but it was the BIG loser in the torture test.

Once again, the generic AAs had the top voltage rating. The alkalines' readings were close, but we'll now separate the men from the boys with the last test.



Clod-A-Leaver II Sweeps 1996 NR/CTPA World Championship

Clod-A-Leaver II-equipped Clodbusters placed 1-2-3-4-5 at the '96 World's. Defending Champion Joe Kirkwood won the championship with Fred Privett, Jr., Fred Privett, Sr., and Brent Riley following close behind. In all, 8 of the top 10 Clodbusters featured **Clod-A-Leaver II** chassis/steering/suspension kits. Earlier in the season at the NR/CTPA US Nationals **Clod-A-Leaver IIs** placed 1-2-3. No other factory-built kits were even close at either event.

Joe's championship Clod featured the new for '97, **Clod-A-Leaver II R chassis kit** (not shown), Trinity Dirtinator motors, Trinity GM-VIS batteries, Tekin 420-G2 speed control, Tekin B112C charger, HiTec 615 Hi-Torque servo, and HiTec mini receiver.

The **Clod-A-Leaver IIR** is a racing chassis/steering/suspension that features a new, super-lite front-mounted servo bracket, slightly redesigned geometry, and also, as a limited extra cost option—titanium ladder bars.

Features that both the original **Clod-A-Leaver II** and the **Clod-A-Leaver II R** share are: super-lite alum chassis, long wheel base ladder bars, extra heavy duty 6-32 ball ends, front and rear swaybars, full cantilever suspension, stainless-steel hardware, and receiver/speed-control tray.

The **Clod-A-Leaver II** kit also includes the proven bumper/brushguard/servo mount that is available separately to fit on any stock or modified Clod. If you don't own a Clod and would like to build one from scratch, you will need 2 complete Clodbuster axle assemblies, wheel and tires, 4 shocks, all electronics, body and body mounts. All of these parts are available from **Bennett Equipment** and a custom kit of stock or aftermarket parts can be arranged to suit your tastes and budget. Four-time national R/C monster truck Champion Joe Kirkwood will also custom build a **Clod-A-Leaver II** to your specifications. Call for quotes.

Videos of the 1996 NR/CTPA World's! An hour-long video is now being edited for release. Exact cost has not been set, but will be very reasonable and very entertaining. Write or call for details.

The **Clod-A-Leaver II** 2-wheel steer kit is \$235 (4-wheel steer kit is \$260), and the **Clod-A-Leaver II R** (racing) 2-wheel steer kit is \$240 (all are 4 w/dr).

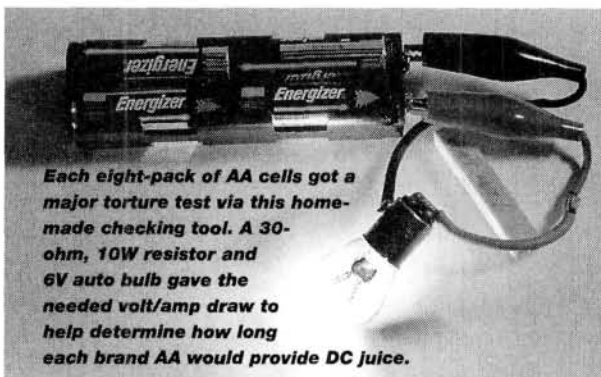
Also available are JPS alum Clodbuster parts as well as almost everything available for Clodbusters.

Bennett Equipment

900 East 1300 South, Romney, IN 47981
(317) 538-2725 (eve.) MC/VISA
SEND \$2 FOR BROCHURE.

HOW TO TEST DRY-CELLS

Test 3



Each eight-pack of AA cells got a major torture test via this home-made checking tool. A 30-ohm, 10W resistor and 6V auto bulb gave the needed volt/amp draw to help determine how long each brand AA would provide DC juice.

DRAIN DOWN TO DEAD

I hooked each brand of AA up to my homemade battery-wrecking machine and allowed it to completely discharge the cells. I attached the DVM to the cells to check voltage output at first load and to monitor the voltage drop until the cells died. I used a stopwatch to record the total time it took each eight-pack of AAs to discharge enough for the 6V bulb to wink-out.

RESULTS	STARTUP LOAD (volts)	DISCHARGE TIME
Duracell	10.20	52 min.
Eveready	10.00	49 min.
Rayovac	9.40	49 min.
Radio Shack	10.40	47 min.
Walgreens	8.49	27 min.

OVERALL RATINGS

As you can see, when the load was applied, the alkalines really showed up the cheaper AA dry cells! Compared with the four other brands, the "bar-gain" Walgreens cells died quickly both in voltage and discharge time.

The alkalines themselves differed about 1 volt from a high of 10.4 (Radio Shack) to a low 9.4 (Rayovac). As for total discharge time, the Duracells topped the chart, closely followed by the Eveready/Rayovac (tie) and Radio Shack AAs.

Let's not forget to factor cost into the final evaluation. The cost of the eight packs of AAs was as follows:

Radio Shack	\$5.99
Eveready	\$5.47
Rayovac	\$4.97
Duracell	\$4.64
Walgreens	\$3.96

So, if you go by cost and capacity, the Duracells were tops followed by the Rayovac, Eveready and Radio Shack cells. Keep in mind, though, that you might be able to buy these alkalines for less than the prices listed here, and that could change the ratings considerably.

Also, for those folks who think Ni-Cds are the only way to go, consider this: I always have a spare transmitter battery loaded with fresh AA alkalines in



These transmitter power packs may look the same, but they serve different purposes. The Ni-Cd cells (bottom) cost less over the long haul, but having AA alkaline batteries (top) as a backup ain't a bad idea! Besides, the alkaline cells put out more voltage.

my race box at all times. How come? Two reasons: first, a Ni-Cd can go DOA, and a fast change to albies will save your bacon. And second, let's suppose you experience radio range problems, or another racer's radio gear seems to be bleeding over into your assigned frequency. Sometimes, and I emphasize "sometimes," the higher voltage of an alkaline-equipped transmitter will solve these problems. The increased voltage can improve radio range and signal strength. It's something to consider.

**Addresses are listed alphabetically in the Index of Manufacturers on page 193.*

From the track to the parking lot.
This is the R/C action as **you** see it.

Grassroots

RACING

This is YOUR PAGE! That's what "Grassroots" means—from the roots—the ground up; and that means YOU!—real, live R/C'ers—readers—an entire page of your stuff! Show the world—yes, everywhere from here to there—what you and your R/C friends are doing. Wanna brag? Here's the spot. Go on; show us! Send photos with captions to "Grassroots Racing," *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606.

Tamiya Championship Series RACE #32

You read about the international gathering of Tamiya Championship Series winners in Japan at Tamiya's Kakagawa headquarters in our race coverage of the Tamiya World Championships earlier in this issue. Well, this is where the TCS races all begin: a parking lot near you! Sixty-nine racers—ranging in age from 11 to 48—gathered in Glendale, WI, to compete in five classes: F1, FWD Sedan, 4WD Sedan, Truck and M-Chassis.



After the action, the winners gathered to pose for this photo. Check out all that Tamiya race apparel.



According to Eric Sands—who organizes and attends all of the TCS races for Tamiya America—every racer competed in the spirit of fine sportsmanship and fun. Thanks to Tamiya, Eric and all those who attend these races for keeping grassroots alive!

Left: 69 racers got together in Wisconsin for a chance to qualify to compete nationally and internationally at the end of the TCS season.

WINNERS

F1

- 1 Bruce Hickman
- 2 Marty Hageman
- 3 Ryan Krause

FWD Sedan

- 1 Scott Ernst
- 2 Jesse Mosca
- 3 Greg Jones

4WD Sedan

- 1 Scott Ernst
- 2 Nathan Johnson
- 3 John Wicht

4x4 Truck

- 1 Ben Hebel
- 2 Kevin Menue
- 3 Carl Seils

M-Chassis

- 1 Marty Hageman
- 2 Tom Knuth
- 3 Al Iverson

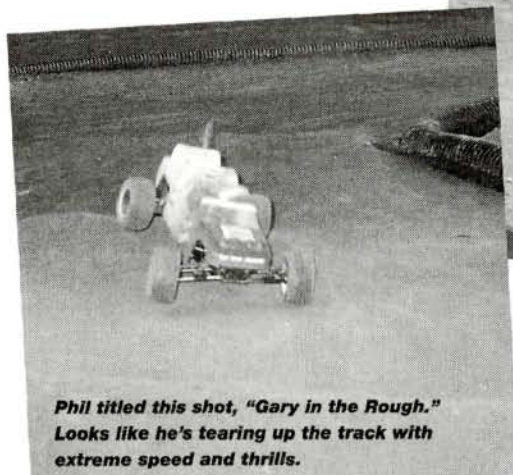
Dirt Slinger's Raceway

Throwin' Dust

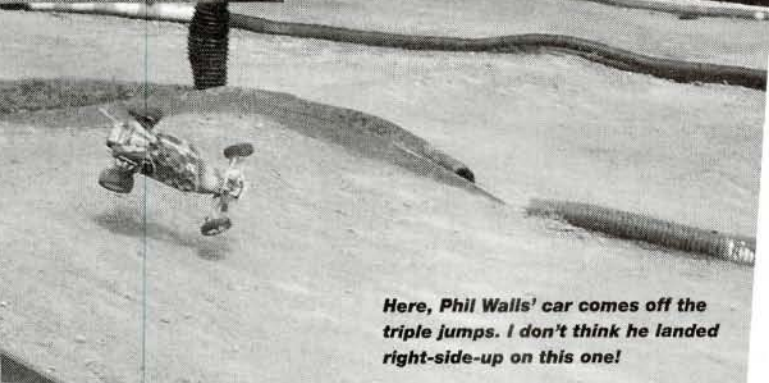


This view of the whole track lets you see that it has more to offer than a couple of turns and a straightaway. Check out the big berm at the back of the track.

The dust lingers in the air after high-speed racing action at the Dirt Slinger's Raceway in Beech Grove, IN. Phil Riley tells us that in the track's first season, it drew more attention and action than anticipated. Each week of racing brought a few new faces and even some visitors from out of state. The 4,400 square feet of track consist of triple jumps, a 4-foot high bank, a tabletop corner and a 100-foot straightaway. Races are run in figure-8 and oval configurations.



Phil titled this shot, "Gary in the Rough." Looks like he's tearing up the track with extreme speed and thrills.



Here, Phil Walls' car comes off the triple jumps. I don't think he landed right-side-up on this one!

Racing Action

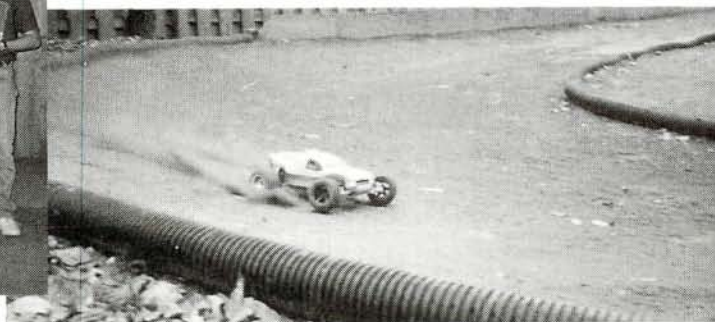
Dirt Slinger's first season of scheduled racing brought 10 events, including six cash-prize and four trophy races. In the stock and mod truck, buggy and gas races, competition was fierce. The trophy events contained three heats, a Main and a "Snake Race," in which competitors vied for the chance to qualify for a 4-foot Snake trophy that's handed out at the end of the season.

The gas events really drew a crowd, so the folks at Dirt Slinger's plan more gas races for the '97 season.

If you happen to be in the Beech Grove/Indianapolis area this year, be sure to stop by to sling some dirt!



On the last day of the season, the winners pose with their trophies and cars. On the left, Phil Walls stands with his 4-foot-high Snake trophy.



Even the practice runs are exciting: here, Keith Dudas pitches it around the sweeper corner during a practice run.

TAMIYA WORLD CHAMPIONSHIPS

(Continued from page 111)

because the German 4WD champion had similar problems and was gridded near Scotty. If he drove brilliantly and stayed out of trouble, Garrett had a chance to finish well on this one. He knew it was something that he could do.

FIRST ROUND OF FINALS

The finals were run in scale fashion—by laps rather than by time. F1 and FWD ran 15 laps, M-chassis ran 12, and 4WD went for 10.

Garrett finished ninth, about 15 seconds behind the leader and took 12 points out of the possible 20. He was looking to do better in the next final. Fred finished seventh with 17 points, 11 seconds behind the leader. Steve finished in second with 19 points, but he completed only 11 laps to the winner's 12. Scott finished 19 seconds behind the leader and took 11th place with 10 points.

More fine-tuning ensued. Tamiya designers and local hot shoes gave the racers last-minute tips. Confidence in the American pits ran high for some and low for others.

LAST CHANCE

Garrett was the first American to hit the track, and he knew that only a miracle would save him in this race, as he was hit hard in the early going and never fully recovered. Later, we found that the front end of his car had been damaged. Tough luck.

Fred was another hard-luck story. After carving up the field with a car that was equal to all the others, Fred showed restraint and speed. Somen was the only one who looked faster. Going into the Taki Chicane, Fred's car was given a light tap by another racer—just enough to make his car swap ends. Unfortunately, his car nosed into a berm and ended up on its lid where the corner marshal could not see him. After much shouting from the crowd, the corner worker attended to Fred's car and sent him on his way. Meanwhile, everyone had passed him and he ended up at the back of the pack. Fred's drive from the back of the pack to an eighth-place finish was nothing short of heroic.

Steve ran next. After his second place in the first final, we had high hopes that he would end up with a podium finish. Steve started well, but during an early lap, he had trouble getting around a VW Bug and decided to go for a bold pass on the sweeper at the end of the straight. Steve moved to the outside and proceeded to motor around the VW on the outside of the turn. The ensuing crash cost Steve a lot of places in this hard-fought class, and although he finished on the

same lap as the leader, he could do no better than sixth.

Scotty suffered from the malady he had suffered from all weekend: no power. He drove well and finished on the same lap as the leader but way back in the field at 16th place.

When the races were over and the awards had been handed out, the organizers held a fun race to give all the racers a chance to let their hair down. Tamiya supplied everyone with Porsche 911 1/10-scale 4WD electric cars for a one-hour endurance race. In addition to the American, European and Japanese teams, there were teams from the Japanese R/C magazines. This was a great event and just what the American drivers needed to regain a little dignity.

The teams picked their fastest runner and stationed him/her across the track. When the signal was given, the runner would sprint across the track to the car, insert the battery, install the battery holder and clip, plug the battery in and place the car on its wheels for the first driver. Fred was our pick for runner, as he was light and lean. Scotty was the first driver because this was his class after all. The race went smoothly and the American drivers did well, finishing second to the team from the Japanese magazine *RC World* who had some incredibly fast pit stops.

Then it was time to have some fun. Moto piled us all into the company van and we hit a huge arcade where everyone jumped into the driving games (don't these guys ever get enough?). Later in the week, there was a fabulous Shabu Shabu dinner with Mr. Tamiya, tours of Tamiya's facilities and a shopping trip to Akihabara (Electric Town) and Asakusa (a popular historic shrine) in Tokyo.

When it was time to go, some of us were eager to get home and see our families and others were sad to leave. None of us will ever forget the fun we had or the people we met.

Like a chance to do it yourself next year? Check out the Tamiya R/C Championship Series races near you. Any top-10 finish in a qualifying class at a regional event will get you a spot in the Nationals in Southern California in September. From there, the winners in each of the eligible classes will be sent to Japan for a shot at the world champion title.

So, do you feel lucky? Do ya? ■

YOUR R/C CAR HEADQUARTERS!

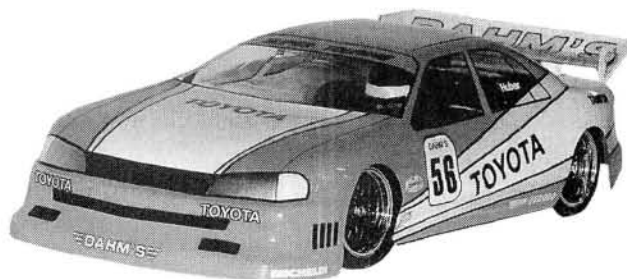
Mobile, AL	(334) 833-8446
Flagstaff, AZ	(520) 214-9887
Gilbert, AZ	(602) 892-0405
Kingman, AZ	(520) 753-4113
Phoenix, AZ	(602) 598-5282
Scottsdale, AZ	(602) 948-3946
Tucson, AZ	(520) 882-8888
Fort Smith, AR	(501) 452-4543
Little Rock, AR	(501) 223-5155
Canyon Country, CA	(805) 251-8555
Chico, CA	(916) 899-2977
Fresno, CA	(209) 435-3342
Milpitas, CA	(408) 945-8524
Colorado Springs, CO	(719) 531-0404
Colorado Springs, CO	(719) 537-0404
Fort Collins, CO	(970) 224-5445
Longmont, CO	(303) 774-1557
Montrose, CO	(970) 249-5451
Vestminster, CO	(303) 431-0482
New London, CT	(203) 439-1400
New Milford, CT	(203) 355-3000
Miami, FL	(305) 273-7803
Ormond Beach, FL	(904) 872-5441
Tampa, FL	(813) 968-7233
Atlanta, GA	(770) 393-4475
Kennesaw, GA	(770) 426-8800
Columbus, GA	(706) 960-1793
Macon, GA	(912) 474-0061
Ames, IA	(515) 232-9080
Boise, ID	(208) 376-1942
Moscow, ID	(208) 882-9369
Bloomington, IL	(309) 827-9693
Naperville, IL	(708) 778-8707
Oak Park, IL	(708) 445-8056
Evansville, IN	(812) 477-7200
Indianapolis, IN	(317) 845-4106
Merrillville, IN	(219) 738-0255
Hutchinson, KS	(316) 662-4499
Lawrence, KS	(913) 865-0883
Overland Park, KS	(913) 649-7979
Wichita, KS	(316) 883-7222
Alexandria, KY	(606) 835-8223
Ashland, KY	(606) 324-1299
Lexington, KY	(606) 277-5664
Louisville, KY	(502) 254-5755
Mayfield, KY	(502) 247-4742
Owensboro, KY	(502) 688-9080
Glen Burnie, MD	(410) 590-4950
Easton, MD	(410) 820-8308
Bellingham, MA	(508) 866-3559
Iron Mountain, MI	(906) 778-0494
Traverse City, MI	(616) 929-5615
Brooklyn Park, MN	(612) 424-6052
Eagan, MN	(612) 452-9260
Minnetonka, MN	(612) 470-7474
Jackson, MS	(601) 957-9900
Kansas City, MO	(816) 459-9590
Lee's Summit, MO	(816) 525-6885
Springfield, MO	(417) 889-5757
St. Louis, MO	(314) 394-0177
Bozeman, MT	(406) 587-3512
Grand Island, NE	(308) 382-3451
La Vista, NE	(402) 597-1888
Lincoln, NE - East	(402) 434-5056
Lincoln, NE - North	(402) 434-5076
Norfolk, NE	(402) 371-2240
Omaha, NE - II	(402) 498-8888
Omaha, NE	(402) 697-9514
Carson City, NV	(702) 883-5475
Las Vegas, NV	(702) 259-0166
Las Vegas, NV - North	(702) 655-0993
Farmington, NM	(505) 325-5156
Amherst, NY	(716) 833-7700
Islandia, NY	(516) 342-1518
Charlotte, NC	(704) 544-2303
Wilmington, NC	(910) 256-0902
Grand Forks, ND	(701) 748-0708
Elyria, OH	(216) 324-5833
Cincinnati, OH	(513) 697-8224
Mentor, OH	(216) 946-5588
Clarkamas, OR	(503) 852-5899
Columbia, SC	(803) 407-2373
Chattanooga, TN	(423) 877-9885
Franklin, TN	(615) 771-7441
Germantown, TN	(601) 757-8774
Knoxville, TN	(423) 690-6423
Nashville, TN	(615) 851-2400
Abilene, TX	(915) 692-6660
Arlington, TX	(817) 557-2225
Austin, TX - South	(512) 440-7577
Austin, TX - North	(512) 246-8904
Dallas, TX	(214) 327-2372
Houston, TX	(713) 955-7097
Piano, TX	(214) 758-7575
San Antonio, TX	(210) 829-8697
San Antonio, TX II	(210) 641-9771
Virginia Beach, VA	(804) 464-4140
Lynnwood, WA	(206) 774-0819
Southcenter, WA	(206) 575-0949
Green Bay, WI	(414) 490-9996
Madison, WI	(608) 833-3353
Oshkosh, WI	(414) 426-1840

HobbyTown USA

Where Hobbies Begin!

Franchise Headquarters

6301 S. 58th Lincoln, NE 68516
(402) 434-5050 • www.hobbytown.com



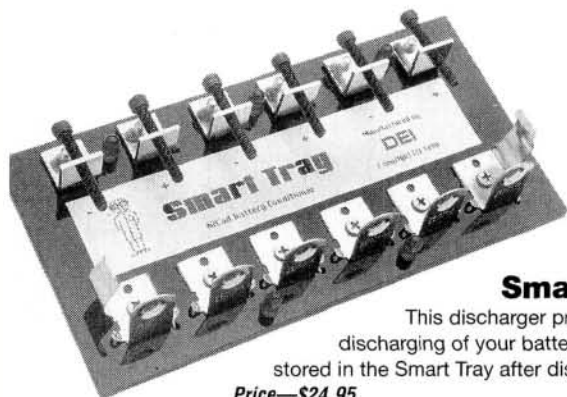
DAHM'S RACING BODIES

Six Bodies for the Associated Dual Sport

Now available from Dahm's are six new bodies to fit the RC10DS: a 1997 minivan, a Honda Accord/Toyota Camry (shown here), a 911/GT1 sports car, a supertruck, a stock car and a pro-stock/pro-street coupe.

Part nos. and prices—D233 (minivan), \$19.98; D231 (Accord/Camry), \$20.98; D226 (911/GT1 sports car), \$20.98; D228 (lightweight supertruck), \$19.98; D229 (heavy supertruck), \$20.98; D201 (lightweight stock car), \$19.98; D202 (heavy stock car), \$20.98; D209 (pro-stock/pro-street car), \$21.98.

Dahm's Racing Bodies, P.O. Box 360, Cotati, CA 94931; (707) 792-1316; fax (707) 792-0137.



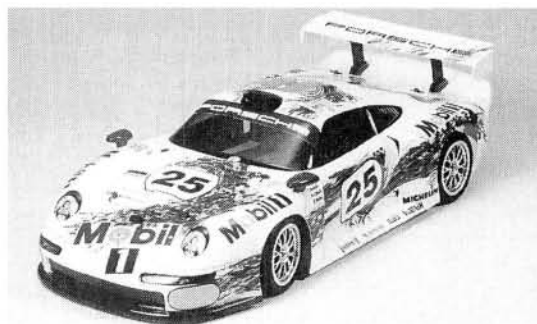
DEI PRODUCTS

Smart Tray

This discharger prevents over-discharging of your batteries. Packs can be stored in the Smart Tray after discharging.

Price—\$24.95.

DEI Products; distributed by ProMatch Batteries, 2033 S. Palo Verde Blvd., Lake Havasu City, AZ 86404; (520) 855-2226.



TAMIYA

1/8-Scale Porsche 911 GT1

This new kit combines the great performance of the TGX chassis and the Le Mans-winning GT1 body. The car features a powerful FS-15LT engine with a vertical "U"-shaped muffler, a 2.5mm Duraluminum chassis, recoil starter and metal bushings. It also offers a traditional polycarbonate shell and offset rear wheels for greater stability. The kit comes with a detailed decal sheet, mirrors and a massive rear wing.

Part no.—44006; price—\$723

Tamiya America, 2 Orion, Aliso Viejo, CA 92656; (800) TAMIYA-A; fax (714) 362-6852.

TRINITY

Official Team Trinity Racing Shirts

Trinity's latest in racing apparel is comfortable and stylish for racing or lounging.

This Team Trinity/Team Losi tee-shirt features the "Monsters of Dirt" logo and team logos on the front.

Part nos. and prices—RC

9705 (L), \$19.99; RC9706 (XL), \$19.99; RC9707 (XXL), \$21.99; RC9708 (XXXL), \$23.99.

Trinity Products Inc., 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.



A&J PRODUCTIONS

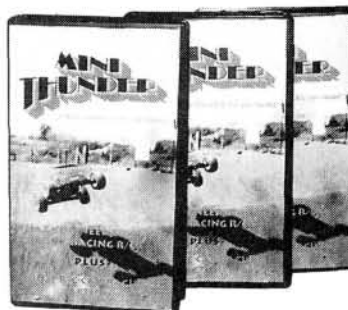
Mini Thunder

This video—a combination of race footage and informative tips—will give you all the information you'll need to get started in R/C car racing.

Part no.—AJ5714;

price—\$17.95.

A&J Productions Inc., 3601 S. Noland Rd., Ste. 223, Independence, MO 64055; (816) 350-3071.





HPI RACING V-Groove Tires

Using their track-proven rubber compound, HPI created a new, longer-lasting tire for off-road trucks. The V-groove design provides maximum grip for street and parking lot racing and fits 2.2-inch truck wheels. Each pair includes foam inserts and mounting instructions.

Part no.—4450; price—\$17.99.

HPI Racing, 22600-C Lambert St.
#904, El Toro, CA 92630; (714)
837-3250; fax (714) 837-3251.



KO PROPO EX-11 Presto Radio

KO Propo has stripped their radio down to basics to make it an affordable performer. Its features include computer-programming capabilities, digitally "stepped" electronic trims, LCD screen, a four-button keypad, 3-model memory, a built-in charge jack, a membrane touchpad and LED power indicator.

Part no.—KOPJ05; price—\$249.99.

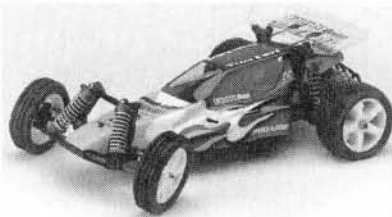
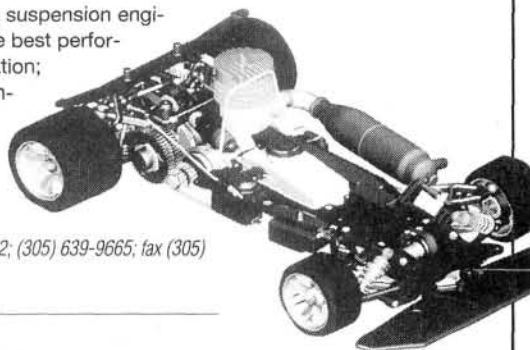
KO Propo; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.

SERPENT Vector 1/8-Scale Car

This 4WD on-road gas car is equipped with the latest in suspension engineering as well as everything it needs to give the car the best performance. Its features include dynamic roll-center stabilization; optimized camber; low polar force/center of gravity components; progressive bias; increased drive-train efficiency; rigid, tri-point rear uprights; ultra-stiff part integration; BBS racing wheels; low-drag gear and belt system; and bulletproof Centax clutch.

Part no.—SER 909000; price—\$1,095.

Serpent U.S.A., West Park Center, 2832 NW 79th Ave., Miami, FL 33122; (305) 639-9665; fax (305) 639-9658.



PROTOFORM Ripper X-CR Body

This body is designed to keep the dirt out and maintain ultimate style of your Losi Double-X 'CR' chassis. In addition to a rear wing, the Ripper provides clearance for installation and removal of electronics, and an air intake to cool any ESC.

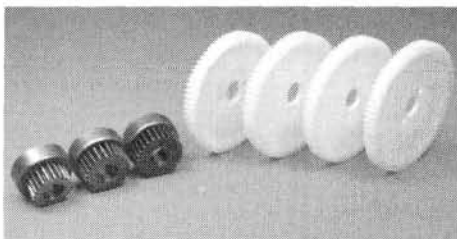
Protoform; distributed by Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.

ROBINSON RACING PRODUCTS GTX Gears

Designed for use with the Losi GTX, these case-hardened clutch bells work with the truck's fixed engine position and offer a wide range of gearing choices.

Part nos. and prices—RRP 1500, 7518, 7718, 7419, 7619, 7320, 7520, 7221, 7321, 7421 (spur gears); \$7.50. RRP 7819, 7820, 7821, 7824, 7825, 7826 (clutch bells); \$9.95.

Robinson Racing Products, 4968 Meadow View Dr., Mariposa, CA 95338; (209) 966-2465; fax (209) 966-5937.

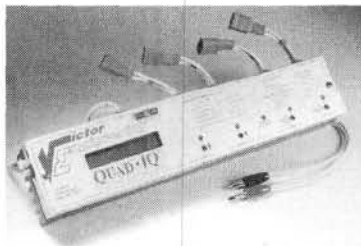


VICTOR ENGINEERING Quad-IQ Battery Charger

This easy-to-program battery charger pushes out all the juice you need to recharge your batteries—four at a time. For control of up to four independent charging ports, the Quad-IQ has one micro-controller and one IQ-style LCD. It also offers improved flex-charging for increased battery capacity, life expectancy and rejuvenation.

Part no.—VE-Quad-IQ; price—\$369.95.

Victor Engineering, 380 Camino De Estrella #170, San Clemente, CA 92672; (714) 830-8483; fax (714) 830-2787.



Descriptions of the products shown here were taken from manufacturer and/or advertising agency press releases. The information given does not constitute an endorsement by Radio Control Car Action or guarantee product performance or safety. When contacting a manufacturer about any product described here, be sure to say you read about it in Radio Control Car Action. Manufacturers! To have your products mentioned here, send press releases to R/C Car Action, What's New, 100 East Ridge, Ridgefield, CT 06877-4606.

1997 RACE SCHEDULE

(Continued from page 136)



August 2-3	Location Not Set Parking Lot Race	With Dan Moynihan
August 8	Dirt Oval #6 So. Cal.	Racers Haven Bakersfield, CA (805) 835-0441
August 22-24	Paved Oval Nationals	Encino Olympic Velodrome Encino CA
September 5-7	Off-Road Nationals	MnM Hobbies Corona, CA (909) 272-3545
September 20-21	Gas Truck Nationals	Real RC Raceway Pleasant Hill, MO (816) 540-5584
October 1-12	Winter Fest Super Oval	Dominguez Hills Velodrome Carson, CA
October 25-26	Paved Course Nationals	Western RC Las Vegas, NV
November 8	Paved Oval Series #6 So. Cal.	Encino Velodrome Encino, CA
November 15	California Off-Road State Champs	Ventura Road Runners Oxnard, CA (805) 529-6057
December 6	Dirt Off-Road Champs	Hot Rod Raceway Saugus, CA (805) 255-2404
DATE	EVENT	HOST TRACK
May 2, 3, 4	7th Annual Southern Nationals R/C Drag Race	Carolina R/C Dragway Clinton, NC (910) 592-9489



GETTING STARTED

(Continued from page 52.)

include a switch; they are "on" as soon as you plug them in to the battery, and if your speed control is in any position but neutral, the wheels will spin, so be sure to have a good grip on your model before you plug in the battery.

Some mechanical speed controls have a Battery Eliminator Circuit (BEC) that allows the main power battery to also power the radio system. Otherwise, you'll need a separate battery (usually four AA-cells) to power the receiver and servos. Almost all radio systems come with a switch harness, and I suggest that you use this with any type of mechanical speed control. This way, you'll be able to turn

the transmitter on first, then the receiver's switch (you do remember this golden rule, right?), then plug in the battery. This is the best way to avoid a runaway car!

Anything goes in the name of tire-smoking speed. Remember that the speed control, whether mechanical or electronic, is the heart of the R/C car. If the speed control doesn't function properly, the car won't either, and speed and performance will be adversely affected. Take time to care for your speed control, and life will be good!

Addresses are listed alphabetically in the Index of Manufacturers on page 193.

DAHM'S [RACING BODIES]



NEW! D229 & D230 '97 ACCORD
Racing Sedan & Wing. Fits 10th Scale Gas Cars like Impact, Impact II, BMT 931, Pico, Pirate 10SR. Superior Aerodynamics, Grill, Head & Taillight Decals. D239 - Light .030 Lexan, D240 Strong .040 Lexan



D226 PIRANHA™ GT1 & WING.
Fits Wide Tamiya, HPI, Kyosho 4WD Sedans, RC10DS & RC10LSS. Superior Ground Effects. Shown Painted like the Porsche Mobil 911/GT1.



D219 & D220 SPITFIRE SS™ Fits RC10LSS & EV10LSS. Wind Tunnel Tested. World's Most Aerodynamic Super Truck Body, D219 Light, D220 Strong ROAR APPROVED!
NEW! D225 SPITFIRE STD™ Fits RC10L
NEW!!! D224 SPITFIRE 12™ Fits RC12L
D221 SPITFIRE™ Fits RC10T & RC10T2



D203 RAMMER™ Fits RC10T2 & RC10T. Low, Light & Narrow. 3-D Side Panels that Hug the Frame. Cooling Vents, Rear Spoiler & Grill Decal.
D205 & D206 RAMMER SS™ Fits RC10LSS
D218 RAMMER STD™ Fits RC10L & EV10



NEW! D236 & D237 CYBER BUGGSY™ Fits RC10T & RC10T2. Features a Cool Roof Scoop, Rear bolt-on Spoiler, Chopped Top, Sun Roof, Split Rear Windows, & Headlight & Taillight Decals. D236 Light .030 Lexan, D237 Strong .040 Lexan

DAHM'S HAS OVER 75 OF THE HIGHEST QUALITY CLEAR LEXAN RACING BODIES FOR INTENSE PRO-LEVEL COMPETITION, PARKING LOT RACING, CONCOURSE, OR JUST FOR FUN! SEND \$2.00 FOR LATEST CATALOG, OR \$4.00 FOR CATALOG & DECALS TO:
DAHM'S RACING BODIES, DEPT. A,
P.O. BOX 360, COTATI, CALIFORNIA 94931 USA
PHONE: 707-792-1316 - FAX: 707-792-0137
<http://www.btown.com/dahms.html>

INDEX OF MANUFACTURERS

Airtronics, 15311 Barranca Pky., Irvine, CA 92718; (714) 727-1474; fax (714) 727-1962.

Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626-1403; (714) 850-9342; (714) 850-1744.

Autographics of California, 4620 New Horizon Blvd., Bakersfield, CA 93313; (805) 836-2886; fax (805) 836-0938.

Ballistic Batteries, P.O. Box 30344, Phoenix, AZ 85046-0344; (602) 493-3717; fax (602) 493-5007.

Bich'n Bodies, 4903 Cloverfield Rd., Pearland, TX 77584; (713) 485-0413.

Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30245; (770) 963-0252; fax (770) 963-7334.

Dan's RC Stuff, 9525-C Cozycroft Ave., Chatsworth, CA 91311.

Deans Connectors, 7628 Jackson St., Paramount, CA 90723; (310) 634-9401.

Du-Bro Products, P.O. Box 815, Wauconda, IL 60084; (800) 848-9411; (708) 526-2136; (708) 526-1604.

DuraTrax; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-1104.

Elite Speed Products; distributed by GHI (see address below).

Extreme Motorsports, Box 776061, 1401 Lincoln St., Steamboat Springs, CO 80477; (303) 879-5102; fax (303) 879-5108.

Frewer; distributed by Japan R/C Imports, P.O. Box 7009-152; Lafayette, CA 94549; (510) 284-5778 (phone and fax).

Futaba Corp. of America, P.O. Box 19767, Irvine, CA 92723-9767; (714) 455-9888; fax (714) 455-9899.

GHI, 2374 N. Orange Mall, Orange, CA 92665; (714) 921-0322; fax (714) 921-0380.

Hitec/RCD Inc., 10729 Wheatlands Ave., Ste. C, Santee, CA 92071-2854; (619) 258-4940; fax (619) 449-1002.

HPI, 22600-C Lambert, Ste. 904, El Toro, CA 92630; (714) 837-3250; fax (714) 837-3251.

Jaco; distributed by Pro-Line (see address below).

JR; distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511.

Kawada; distributed by GHI (see address above).

Kimbrough Products, 1322 Bell Ave., Unit 1-C, Tustin, CA 92680; (714) 258-7426; fax (714) 258-7426.

Kyosho/Great Planes Model Distributors, 2904 Research Rd., P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.

Lightning Products, 12519 Wanda Ln., Magnolia, TX 77355.

Litespeed, P.O. Box 4765, Spokane, WA 99202; (509) 535-2717.

LRP, Wilhelm-Ehnsle-Str. 134, 7064 Remshalden, Germany.

Lunsford Racing, 2500 Three Lakes Rd., Ste. A, Albany, OR 97321; (503) 928-0587; fax (503) 967-5917.

MIP, 746 E. Edna Place, Covina, CA 91723; (818) 339-9008; fax (818) 966-2901.

Motor Man; distributed by Hobby Warehouse of Sacramento, 8950 Osage Ave., Sacramento, CA 95828; to order (800) 333-3640; (916) 381-7588; fax (916) 381-7589.

New Era Models, P.O. Box 7378, Nashua, NH 03060-7378; (603) 880-3453; fax (603) 888-8645.

Novak Electronics Inc., 18910 Teller Ave., Irvine, CA 92612; (714) 833-8873; (714) 833-1631.

O'Donnell Racing, 10702 Hathaway Dr., # 2, Santa Fe Springs, CA 90670; (310) 944-6821; fax (310) 944-9671.

O.S.; distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826; (217) 398-6300.

Orion; distributed by Peak Performance, (see address below).

Paragon Racing Products, 340 Industrial Blvd., Waconia, MN 55387-1738; (612) 442-6364; fax (612) 442-6368.

Parma Intl., 13927 Progress Pky., North Royalton, OH 44133; (216) 237-8650; fax (216) 237-6333.

Peak Performance; 23352-J Madero Rd., Mission Viejo, CA 92691; (714) 707-4683; fax (714) 707-4684.

Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.

ProMatch Batteries, Lake Havasu City, AZ 86404; (520) 855-2226.

Protoform Inc., P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.

Reedy Modifieds/Team Associated, 3585 Cadillac Ave., Costa Mesa, CA 92626; (714) 850-9342; fax (714) 850-1744.

Sanyo, 2001 Sanyo Ave., San Diego, CA 92173; (619) 661-6620; fax (619) 661-6743.

Slix Decals, 13075 Springdale St., Ste. 456, Westminster, CA 92683; (714) 891-4212.

Tamiya America Inc., 2 Orion, Aliso Viejo, CA 92656-4200; (800) TAMIYA-A; (714) 362-2250.

TD Enterprises, P.O. Box 3301, Lexington, OH 44904; (419) 884-2004.

Team Losi, 13848 Magnolia Ave., Chino, CA 91710; (909) 465-9400; fax (909) 590-1496.

Tekin Electronics, 940 Calle Negocio, San Clemente, CA 92673; (714) 498-9518; fax (714) 498-6339.

Testor Corp., 620 Buckbee St., Rockford, IL 61104; (815) 962-6654; fax (815) 962-7401.

Traxxas Corp., 12150 Shiloh Rd., #120, Dallas, TX 75228; (972) 613-3300; fax (972) 613-3599.

Trinity Products, 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.

Tru-Match, 9335 Chester Rd., Richmond, VA 23237.

WCM Inc., Rt. 2, Box 207A, Buffalo, TX 75831; (903) 322-4869; fax (903) 322-3643.

Yokomo Ltd.; distributed by GHI (see address above).

Zenoah; distributed by ISC Intl., 10620 N. College Ave., Indianapolis, IN 46280; (317) 844-1978.

ADVERTISER INDEX

Ace Hardware Hobbies.....	122-123,124-127
Airtronics.....	9
America's Hobby Center, Inc.....	72-77
Associated Electrics.....	10-11,36-37,50,80-81,116,150
B&B Software.....	142
B&T R/C Products.....	95
Boca Bearing.....	95
Bolink R/C Cars, Inc.....	190
BSR Enterprises.....	148
C&M Manufacturing, Inc.....	143
Competition Electronics.....	177
Competition R/C Imports.....	158
Custom Electric Cars.....	174
D'Arcy Masius.....	35
Dahn's Racing Bodies.....	183
Danbury Mint.....	47
Davis Diesel Development.....	158
Dillon Racing.....	142
DuraTrax.....	144
ERI Associates, Inc.....	136
Futaba.....	175
GHI.....	174
GM-Racing.....	103
Hammad Ghuman.....	33
Hitec.....	27,57
Hobby Etc., Inc.....	85
Hobby Products International.....	28-29,88
Hobby Shack.....	140-141
Hobby Warehouse of Sacramento.....	184-187
HobbyTown USA.....	158,167
Honda House Motor Speedway.....	144
Horizon Hobby Distributors, Inc.....	149
Innovative Technologies.....	148
Japan R/C Imports.....	98,99
Kyosho Corporation.....	14-15,38,110,159
Lunsford Racing.....	179
M&W Hobbies.....	174
MIP.....	181
Maxtec Development.....	191
Model Rectifier Corporation.....	C4
Mugen.....	61
Novak.....	21,31,45
Omni Models.....	170-173
OS Engines.....	176
Parma International, Inc.....	95
Paso Robles Hobby.....	142
Peak Performance.....	41,94,182
Performance Raceway.....	153
Pro-Line.....	C3,6-7
Progressive Technologies.....	178
R/C Car Kings.....	86
Racetech Motor Sports.....	142
Realistic Racing Colors.....	95
Robinson Racing Products.....	165
RPM.....	53
Savon.....	137-139
Schumacher, Inc.....	192
Serpent Model Racing Cars.....	108-109,166
Sheldon's Hobbies.....	160-163
Skittles.....	35
Slix Decals.....	144
Southside Hobbies.....	153
Stormer Racing Hobbies.....	112-115
TD Enterprises.....	158
Tamiya.....	C2,48-49
Team Losi.....	17,18-19,104-105,145,154-155
Tekin Electronics.....	82,164
Thunder Tiger.....	59
Tower Hobbies.....	128-133
Traxxas Corporation.....	180
Trinity.....	3,4,5,12-13,22,24-25,55,87,146-147
W.S. Deans, Inc.....	43
Wood Racing.....	152
World Class, Inc.....	102
Yokomo Ltd.....	66,67

RADIO CONTROL CAR ACTION (ISSN 0886-1609, USPS 001-087) is published monthly by Air Age Inc., 100 East Ridge, Ridgefield, CT 06877-4606. Copyright 1997, all rights reserved. The contents of this publication may not be reproduced in whole or part without the consent of the copyright owner. Periodical postage permit paid at Ridgefield, CT, and additional mailing offices.

SUBSCRIPTIONS Call (800) 877-5169. U.S.: 1 year, \$34.95; 2 years, \$59.95. Canada: 1 year, \$51.31; 2 years, \$91.97 (Canadian prices include G.S.T.). Elsewhere: 1 year, \$47.95; 2 years, \$85.95. Canadian G.S.T. registration no. 13075 4872 RT.

EDITORIAL. Send correspondence to Editors, *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. We welcome all editorial submissions, but assume no responsibility for the loss or damage of unsolicited material. To authors, photographers and people featured in this magazine: all materials published in *Radio Control Car Action* become the exclusive property of Air Age Inc., unless prior arrangement is made in writing with the Publisher.

ADVERTISING. Send advertising materials to Advertising Department, *Radio Control Car Action*, Air Age Inc., 100 East Ridge, Ridgefield, CT 06877-4606; phone (203) 431-9000; fax (203) 431-3000.

CHANGE OF ADDRESS. To make sure you don't miss any issues, send your new address to *Radio Control Car Action*, P.O. Box 427, Mount Morris, IL 61054-9853, six weeks before you move. Please include the address label from a recent issue, or print the information exactly as shown on the label. The Post Office will not forward copies unless you provide extra postage.

POSTMASTER. Please send Form 3579 to *Radio Control Car Action*, P.O. Box 427, Mount Morris, IL 61054-9853.

Sore

Losers

Chris's



hate bumper stickers ... I mean, people hanging their opinions on the backs of their cars like anybody really gives a damn. I did, however, see one that got me; it read, "People Suck." Now, that's a bit *too* cynical even for me. If I were to put such a bumper sticker on my car I would modify it slightly to read, "Some People Really Suck." The following is a testament to those people and only goes to prove that you should hang with the winners, not the losers—especially sore losers!

Chris,
I just started racing this summer, I am very new and know very little about driving techniques and car adjustments. I run at my local hobby shop with a Losi Double-X buggy with some modifications. My problem is that I seem to be pretty good. I usually come in second or third in the A-Main. People are really giving me a hard time; they say I cheat. It hurts, it really does. It probably hurts because I DON'T cheat. I stay in third or fourth the whole race and then at the end make my move; what's wrong with that? I am in no way cheating; I'm not pushing, flipping, cutting across rails or anything. And my car is race spec with no special modifications to the motor or anything. They won't tell me what's wrong; they just ignore me. I can't go to other tracks; this is the only track in my area. What should I tell them? They are driving me nuts. I don't want to quit because of them. My theory is that they can't stand it that a rookie is beating most of them. Thanks for reading this.

Chris D.
trafford@postoffice.ptd.net

This is my page—mine!

The opinions expressed on this page do not necessarily represent the opinions of the entire Car Action staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. My internet address is: chrisc@airage.com.

"My problem is that I seem to be pretty good"

Your problem? ... YOUR problem!? Chris, are you kidding me with that statement or what!?!? You are kidding me, right?

Look, you don't have a problem. Those jealous

losers, THEY have the problem, man. Do not let them make THEIR PROBLEM your problem—OK? And they will always try, Chris, try very hard to do just that. Know why? 'Cause your natural driving talent is driving them nuts. Don't let their behavior drive you nuts; that's exactly what they want. They can't win fair and square on the track, so they try to get even with you anywhere else they can. They're weak-minded little trolls who can't handle it (THEY CAN'T HANDLE THE TRUTH!!). It's all a huge compliment, man; take it as one. Trust me on this.

Whenever anybody excels at something—I don't care if it's sports, playing the guitar, speaking three languages, getting good-looking girlfriends, or racing R/C cars—there will always, ALWAYS be the envious types who will try to ruin it for you. Don't let them. It's that simple. The best way to deal with morons like this is be happy. That, they can't take; it's almost too much for them. It's the best revenge of all! Be happy that you're a victorious, gifted driver. The crap they're throwing your way isn't about you; it's about them and their own insecurities—simply *not your problem*. You're too busy being a great driver.

...there
will always, ALWAYS
be the envious types who
will try to ruin it for you.
Don't let them. It's that
simple.

If they ignore you, then I say, screw them! Guys like that are nothing more than the south end of a north-bound horse. Believe me when I tell you, they go to bed at night and cry their eyes out in the laps of their teddy bears wishing they could drive like you. Not everyone is like this; many aren't. There are lots of others to be friends with. Start taking a real friend to the track. A true friend will appreciate your talent and cheer you on. Don't let those idiots push you away from the track. Again, that's exactly their hidden motive.

I do not want to hear that you let them scare you away.

Keep kickin' their butts and have fun!
CC

P.S. Gee, can you tell I have strong feelings on this subject? ■

The Lot's Net Monster
A view from the
brilliance ever present
on the Internet

WONDERING
I was just wondering how you pick the topics for your page (Chris's Back Lot)? Do you see something interesting and just decide to do something on that, or do you actually plan it out and put some thought into it?

Eric Whitehouse
Rc10man@aol.com

Luna is the source of all inspiration. CC

